GCET/45/2015-16, Dt. 29-09-15

No. SR/FTP/ES-156/2014

SCIENCE & ENGINEERING RESEARCH BOARD (SERB)

(A Statutory Body of the Department of Science & Technology, Government of India)

Technology Bhavan
New Mehrauli Road
New Delhi – 110016
Dated: 4th September, 2015

ORDER

Subject: Financial assistance for the Research Project under START UP GRANT FOR YOUNG SCIENTISTS entitled "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath".

PI: Dr. V. Satya Srinivas, Associate Professor/Principal Investigator, Dept. of Electronics and Communication Engineering, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503.

Sanction of the Science and Engineering Research Board (SERB) is here by accorded to the above mentioned project at a total cost Rs. 21,50,000/- only (Rupees Twenty One Lakh and Fifty Thousand only) with a break up of non recurring (Capital Budget Head) grant of Rs. 15,00,000/- only (Rupees Fifteen Lakh only) and recurring (General) grant of Rs. 6,50,000/- only (Rupees Six Lakh and Fifty Thousand only) for a period of three years to **Principal, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503** towards implementation of the above said project as per the following breakup of funds:

Sl. No.	Head	Total (in Rs.)
A	**Non-recurring (Capital Items)**	
1	Equipments [GNSS receiver, Work station, Printer]	15,00,000
A'	Total (Capital)	15,00,000
B	**Recurring Items (General)**	
1	General – A [Consumables, Contingency, Travel-domestic]	3,50,000
2	General – B (Overhead Charges)	3,00,000
B'	Total (General)	6,50,000
C	**Total cost of the project (A'+B')**	**21,50,000**

2. Sanction of the SERB is also accorded to the payment of Rs. 17.00 Lakh only with a break up of Rs. 15.00 Lakh only under Non-Recurring and Rs. 2.00 Lakh only under Recurring to the **Principal, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503** being the grant for the year 2015-16 for implementation of the said research project.

3. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority audit whenever the institute is called upon to do so.

4. The sanctioned equipments would be procured as per GFR 2005 and its disposal would be done with prior approval of SERB.

5. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

6. The expenditure involved is debitable to

Fund for Science & Engineering Research (FSER)

7. The Sanction has been issued with the approval of the competent authority under delegated powers and vide Diary No. SERB/F/1252/2015-16 dated 13.06.2015.

8. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website (www.serb.gov.in).

Contd....2 -

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

29/9/15

Gmail

Dr. V S Srinivas GCET - SC0881 <sathyavemuri@gmail.com

RTGS/NEFT UTR/ TRANS No. – File No. SR/FTP/ES-156/2014

29 September 2015 at 12

Finance Wing, SERB <finance@serb.gov.in>
To: sathyavemuri@gmail.com
Cc: "DR. UMESH KUMAR SHARMA, SCIENTIST 'E'" <uk.sharma@nic.in>

Mr/Ms/Prof/Dr.

V SATYA SRINIVAS

D/o ELECTRONICS AND COMMUNICATION ENGINEERING,

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY,

CHEERYAL, KEESARA - 501503

TELANGANA

Subject: RTGS/NEFT UTR/ TRANS No. – File No. SR/FTP/ES-156/2014

Sir/Madam,

I am directed to refer to **Science & Engineering Research Board (SERB)** sanction order no. **SR/FTP/ES-156/2014**dated **04-09-2015** and forward herewit the following for information and necessary action:

RTGS/NEFT UTR/Transaction no.: UBINH15266199369 / SAA157356413dated **23-09-2015.**

1700000/- (RUPEES SEVENTEEN LAKH ONLY)

Bill no. GIA/3254 dated 16-09-2015

SERB/F/1252/2015-16

CONFIRMATION OF RECEIPT OF GRANTS MAY KINDLY BE SENT BY **EMAIL** ONLY.

SEPARATE Utilization Certificates (UCs) for **Recurring and Non-Recurring Grants (even if *DISBURSED BY SERB THROUGH ONE SANCTIO ORDER*** for your project) should be **sent directly** to the grant Sanctioning Authority by name *(signatory of the sanction order)* **within twelve months of th closure of the financial year in which the grants were released irrespective of whether the subsequent instalment of grant is due for release c not.**

However, if any unspent balance is to be **refunded**, kindly ensure that the unutilized amount may be refunded immediately by way of an **a/c paye cheque/DD** drawn in favour of **"Fund for Science & Engineering Research", payable at New Delhi** and **forwarded to the undersigned at the addres given below:**

The Finance & Budget Officer

Science & Engineering Research Board (SERB)

5 & 5A, Lower Ground Floor, Vasant Square Mall,

Vasant Kunj, New Delhi 110070

USE LESS PAPER, PLANT MORE TREES, SAVE PLANET EARTH

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

for
Finance & Budget Officer
Science & Engineering Research Board (SERB)
(A statutory body under the Government of India's Department of Science & Technology)
5 & 5-A, Lower Ground Floor, Vasant Square Mall
Vasant Kunj, New Delhi 110070
INDIA
+91-11-40000328-9
+91-9818223293
+91-9818223294

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विज्ञान और इंजीनियरी अनुसंधान बोर्ड
(विज्ञान और प्रौद्योगिकी विभाग, भारत सरकार का एक सांविधिक निकाय)
SCIENCE & ENGINEERING RESEARCH BOARD
(A Statutory body of Department of Science and Technology, Govt. of India)

Dr. Prahlad Ram
Scientist-C,
Phone: 011-40000343
E-mail: prahlad@serb.gov.in

Dated: 21.10.2016

File No.: SR/FTP/ES-156/2014

Subject: Permission for leave from July 2016 to March 2017 (9 months) to attend the research work at UEC, Japan.

Dear Dr. Srinivas,

This is in response to your letter dated 4.07.2016 for seeking approval to visit University of Electro-Communications (UEC), Japan for nine months from July 2016 to March 2017. Considering your request, the Science and Engineering Research Board permit you to avail this opportunity.

With regards,

Yours sincerely,

21.10.2016

(PRAHLAD RAM)

To,

Dr. V.Satya Srinivas, Associate professor,
Department of Electronis & Communication Engineering,
Geethanjali College of Enginnering and Technology,
Cheeryal(V), Keesara (M), RR District,
Telengana-501301

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

No. SR/FTP/ES-156/2014

SCIENCE & ENGINEERING RESEARCH BOARD (SERB)

(A Statutory Body of the Department of Science & Technology, Government of India)

5&5A, Lower Ground Floor,
Vasant Square Mall, Sector-B,
Pocket-5, Vasant Kunj,
New Delhi - 110070

Dated: 15.11.2018

ORDER

Sub: Research Project entitled "***Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath***"

PI: Dr. V. Satya Srinivas, Associate Professor, Electronics and Communication Engineering, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503, Hyderabad.

In continuation to the order of even number dated 29.05.2018, sanction of the Science and Engineering Research Board is accorded to extend the project duration for six months i.e. from 23.09.2018 to 22.03.2019 (ex-post facto) without any additional grant.

2. The organization/institute/univerity should ensure that the technical support/financial assistancce provided to them by the SERB, a statutory body of the DST, Government of India should invariably by highlighted / acknowledged in their media release as well as in bold letters in the opening paragraphs of their Annual Report.

3. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/programme funded by the SERB, a statutory body of the DST, Government of India.

4. This order has been issued with the approval of the competent authority.

(Dr. Prahlad Ram)
Scientist-C

Copy forwarded for information and necessary action to: -

1. The Under Secretary, SERB, New Delhi.
2. Sanction Folder, SERB, New Delhi.
3. File Copy
4. Dr. V. Satya Srinivas, Associate Professor, Electronics and Communication Engineering, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503, Hyderabad.
5. Principal, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503, Hyderabad.

(Dr. Prahlad Ram)
Scientist-C

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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Phone : 040-32519687
Fax : +91-40-24220320
Website : www.geethanjaliinstitutions.com

Geethanjali

Geethanjali College of Engineering and Technology

(Accredited by NBA, Approved by AICTE, New Delhi and Affiliated to JNTU, Hyderabad)
Sy.No. 33 & 34, Cheeryal (V), Keesara (M), Ranga Reddy District. - 501 301.

No.GCET/ECE/R&D/~~DST~~ SERB/ 594 /2016 Date:25th May 2016

To
Dr. Umesh Kumar Sharma
Scientist-E
Earth and Atmospheric Sciences,
Science and Engineering Research Board (SERB),
5&5A, Lower Ground floor,
Vasant Square Mall, Sector-B, Pocket-5,
Vasant Kunj, New Delhi - 110070

Sub:-Submission of Statement of expenditure, fund utilization certificate and Progress Report – DST sponsored project entitled "Investigation of Linear Combinations of GNSS Data to Mitigate the Effect of Ionosphere and Multipath" - Reg.

Ref: DST Sanction Order No: SR/FTP/ES-156/2014, dt: 4th September 2015

Dear Sir,

This is with reference to the subject cited above. I herewith enclose the statement of expenditure and fund utilization certificate in duplicate for the period **23rd September 2015 to 31st March 2016** along with Ten copies of Project report (10 No's) for your kind perusal.

Kindly do the needful for releasing of the second installment of grant.

Thanking you,

Sincerely,

Dr. V. Satya Srinivas
(Principal Investigator)

Dr.V.SATYA SRINIVAS,M.E.,Ph.D
Associate Professor
Dept. of Electronics & Communication Engg.
Geethanjali College of Engg and Tech.
Cheeryal (V), Keesara (M), R.R. Dist.
Telangana,India - 501301

Encls: 1. Project report (10 Nos.)
2. Expenditure statement (2 Nos.)
3. Utilization certificate (2 Nos.)

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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Annexure-III

UTILISATION CERTIFICATE

[FOR THE FINANCIAL YEAR - 2015-16 (23rd SEPTEMBER 2015 to 31st MARCH 2016)]

1. Title of the Project/ Scheme : "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" under start up grant for young scientist scheme.

2. Name of the Institution : Geethanjali College of Engineering and Technology (GCET)

3. Name of the Principal Investigator: Dr. V. Satya Srinivas

4. Science & Engineering Research Board (SERB)
Sanction order No & date sanctioning the project: SR/FTP/ES-156/2014, dt: 4th Sept. 2015
(First financial sanction order)

5. Head of account as given in the original sanction order: A. Non-Recurring (Capital Items)
   1. GNSS Receiver
   2. Work station
   3. Printer

   B. Recurring Items (General):
   1. General A (Consumables, Contingencies, Travel-domestic).
   2. General B (Overhead Charges).

6. Amount brought forward from the previous Financial year quoting SERB letter no and date in which the authority to carry forward the said amount was given : i. Amount: -Nil-
ii. Letter No.: -Nil-
iii. Date:-Nil-

7. Amount received during the financial year (Please give SERB Sanction order no and date) : i. Amount : **Rs.17 Lakhs**
ii. Order No : SR/FTP/ES-156/2014
iii. Date : 4th Sept. 2015

8. Total amount that was available for expenditure (excluding commitments) during the financial year (Sr. No. 6+7) : **Rs.17,00,000/-**

9. Actual Expenditure (excluding commitments) Incurred during the financial year (upto 31st March) : **Rs. 8,48,039/-**

10. Balance amount available at the end of the financial year: **Rs.8,74,696/-**

11. Unspent balance refunded, if any (please give details of cheque no etc.): -Nil-

12. Amount to be carried forward to the next financial year (if applicable): **Rs.8,74,696/-**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

UTILISATION CERTIFICATE

Certified that out of **Rs. 17,00,000/-** of grants-in-aid sanctioned during the year **2015-16** in favour of Geethanjali College of Engg. & Tech., vide SERB order No. SR/FTP/ES-156/2014, dated: 4th September 2015 and Rs.-Nil- on account of unspent balance of the previous year, a sum of **Rs. 8,48,039/-** has been utilised for the purpose of execution of the project entitled "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" for which it was sanctioned and that the balance of **Rs.8,74,696/-** remaining unutilised at the end of the year will be adjusted towards the grants-in-aid payable during the next year i.e. 2016-17.

(Dr. V. Satya Srinivas)	(Dr. S.Udaya Kumar)	(B.Mallesham)	For HARI BABU & ASSOCIATES CHARTERED ACCOUNTANTS Firm Regn. No. 001
Signature of PI	Signature of Head of the Institute	Accounts Officer of the Institute	Auditor
Date: 9/5/2016	Date: 11/5/16	Date: 11/5/2016	Date: (CA. HARI BABU) Partner M. No. 022361

PRINCIPAL
Geethanjali College of Engg. and Tech
Cheeryal (V), Keesara (M), R.R. Dist. (A.P.)-501

(Countersigned in SERB)
Signature:
Designation:
Date:

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Statement of Expenditure
(Period: 23rd September 2015 to 31st March 2016)

Sr. No.	Sanctioned Heads	Total Funds Allocated (indicate sanctioned or revised)	Expenditure Incurred			Total Expenditure till 31st March 2016 VII= IV+V+VI	Balance as on (31st March 2016) VIII = III – VII	Requirement of Funds upto 31st March 2017	Remarks (if any)
			1st Year (23rd September 2015 to 31st March 2016)	2nd Year	3rd Year				
(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)		
1.	**Non-recurring (Capital Items)** Equipments [GNSS Receiver, Work Station and Printer]	Rs.15,00,000/-	Rs. 7,48,860/-	-NA-	-NA-	Rs. 7,48,860/-	Rs. 7,51,140/-*	Rs.7,51,140/-	Purchase order were placed for GNSS Receiver & Work station and printer. Received the items and successfully installed in March 2016. As per payment terms 50% of the amounts were paid at time of PO and the balance amount was paid in April 2016.
2.	**Recurring Items (General)** General-A: (Consumables, Contingencies & Travel-domestic)	Rs.3,50,000/-	Rs.40,679/-	-NA-	-NA-	Rs.40,679/-	Rs.3,09,321/-	Rs.1,50,000/-	-Nil-
	General-B: (Overhead Charges)	Rs.3,00,000/-	Rs.58,500/-	-NA-	-NA-	Rs.58,500/-	Rs.2,41,500/-	Rs.1,00,000/-	-Nil-
3.	**Total**	**Rs.21,50,000/-**	**Rs. 8,48,039/-**	-NA-	NA	**Rs. 8,48,039/-**	**Rs.13,01,961/-**	**Rs.10,01,140/-**	**-Nil-**

*Note: 1. The PolaRxs Pro GNSS receiver of make: Septentrio, NV Belgium was received and installed on 23rd March 2016. The details of PO and invoice are as follows: PO No. GCET/ECE/R&D/DST/518/2015-16, dt: 12 Jan. 2016 (Total Cost: Rs.13,87,784/-), Proforma Invoice No.1401, dt:14th Jan. 2016, Invoice No.150278, dt: 24th March 2016, (copies are enclosed with expenditure statement). As per payment terms 50% of the total amount i.e. Rs.6,93,892/- was paid as advance on 18 Jan.2016. Balance amount of Rs.6,93,892/- was paid on 20th April 2016 after successful installation and testing.

2. The HP work station (Model:Z230) and Printer (model: M1136 MFP) were procured and installed on 26th March 2016. The details of PO and invoice are as follows: PO No.GCET/ECE/R&D/DST/557/2015-16, dt:10th March 2016 (Total Cost: Rs. 1,09,935/-), Invoice No. 150103367, dt:26thMarch 2016 (copies are enclosed with expenditure statement). As per payment terms, 50% of the total amount i.e. Rs.54,968/- was paid as advance on 15th March 2016. Balance amount of Rs.54,967/- was paid on 11th April 2016 after successful

(Dr. V. Satya Srinivas)
Signature of PI
Date: 9/5/2016

(Dr. S.Udaya Kumar)
Signature of Head of the Institute (with seal)
Date: 11/5/2016

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), R.R. Dist. (A.P.)-501 301

(B.Mallesham)
Accounts Officer of the Institute
Date: 11/5/2016

Auditor
Date:

For HARI BABU & ASSOCIATES
CHARTERED ACCOUNTANTS
Firm Regn. No. 001064S
(Ch. HARI BABU) Partner
M. No. 022951

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Annexure-III

UTILISATION CERTIFICATE

[FOR THE FINANCIAL YEAR - 2015-16 (23rd SEPTEMBER 2015 to 31st MARCH 2016)]

1. Title of the Project/ Scheme : "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" under start up grant for young scientist scheme.

2. Name of the Institution : Geethanjali College of Engineering and Technology (GCET)

3. Name of the Principal Investigator: Dr. V. Satya Srinivas

4. Science & Engineering Research Board (SERB)
Sanction order No & date sanctioning the project: SR/FTP/ES-156/2014, dt: 4th Sept. 2015
(First financial sanction order)

5. Head of account as given in the original sanction order: A. Non-Recurring (Capital Items)
   1. GNSS Receiver
   2. Work station
   3. Printer

   B. Recurring Items (General):
   1. General A (Consumables, Contingencies, Travel-domestic).
   2. General B (Overhead Charges).

6. Amount brought forward from the previous Financial year quoting SERB letter no and date in which the authority to carry forward the said amount was given : i. Amount: -Nil-
ii. Letter No.: -Nil-
iii. Date:-Nil-

7. Amount received during the financial year (Please give SERB Sanction order no and date) : i. Amount : **Rs.17 Lakhs**
ii. Order No : SR/FTP/ES-156/2014
iii. Date : 4th Sept. 2015

8. Total amount that was available for expenditure (excluding commitments) during the financial year (Sr. No. 6+7) : **Rs.17,00,000/-**

9. Actual Expenditure (excluding commitments) Incurred during the financial year (upto 31st March) : **Rs. 8,48,039/-**

10. Balance amount available at the end of the financial year: **Rs.8,74,696/-**

11. Unspent balance refunded, if any (please give details of cheque no etc.): -Nil-

12. Amount to be carried forward to the next financial year (if applicable): **Rs.8,74,696/-**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

UTILISATION CERTIFICATE

Certified that out of **Rs. 17,00,000/-** of grants-in-aid sanctioned during the year **2015-16** in favour of Geethanjali College of Engg. & Tech., vide SERB order No. SR/FTP/ES-156/2014, dated: 4th September 2015 and Rs.-Nil- on account of unspent balance of the previous year, a sum of **Rs. 8,48,039/-** has been utilised for the purpose of execution of the project entitled "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" for which it was sanctioned and that the balance of **Rs.8,74,696/-** remaining unutilised at the end of the year will be adjusted towards the grants-in-aid payable during the next year i.e. 2016-17.

(Dr. V. Satya Srinivas)	(Dr. S.Udaya Kumar)	(B.Mallesham)	For HARI BABU & ASSOCIATES CHARTERED ACCOUNTANTS Firm Regn. No. 001
Signature of PI	Signature of Head of the Institute	Accounts Officer of the Institute	Auditor
Date: 9/5/2016	Date: 11/5/16	Date: 11/5/2016	Date: (CA. HARI BABU) Partner M. No. 022361

PRINCIPAL
Geethanjali College of Engg. and Tech
Cheeryal (V), Keesara (M), R.R. Dist. (A.P.)-501

(Countersigned in SERB)
Signature:
Designation:
Date:

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Statement of Expenditure
(Period: 23rd September 2015 to 31st March 2016)

Sr. No.	Sanctioned Heads	Total Funds Allocated (indicate sanctioned or revised)	Expenditure Incurred			Total Expenditure till 31st March 2016 VII= IV+V+VI	Balance as on (31st March 2016) VIII = III – VII	Requirement of Funds upto 31st March 2017	Remarks (if any)
			1st Year (23rd September 2015 to 31st March 2016)	2nd Year	3rd Year				
(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)		
1.	**Non-recurring (Capital Items)** Equipments [GNSS Receiver, Work Station and Printer]	Rs.15,00,000/-	Rs. 7,48,860/-	-NA-	-NA-	Rs. 7,48,860/-	Rs. 7,51,140/-*	Rs.7,51,140/-	Purchase order were placed for GNSS Receiver & Work station and printer. Received the items and successfully installed in March 2016. As per payment terms 50% of the amounts were paid at time of PO and the balance amount was paid in April 2016.
2.	**Recurring Items (General)** General-A: (Consumables, Contingencies & Travel-domestic)	Rs.3,50,000/-	Rs.40,679/-	-NA-	-NA-	Rs.40,679/-	Rs.3,09,321/-	Rs.1,50,000/-	-Nil-
	General-B: (Overhead Charges)	Rs.3,00,000/-	Rs.58,500/-	-NA-	-NA-	Rs.58,500/-	Rs.2,41,500/-	Rs.1,00,000/-	-Nil-
3.	**Total**	**Rs.21,50,000/-**	**Rs. 8,48,039/-**	-NA-	NA	**Rs. 8,48,039/-**	**Rs.13,01,961/-**	**Rs.10,01,140/-**	**-Nil-**

*Note: 1. The PolaRxs Pro GNSS receiver of make: Septentrio, NV Belgium was received and installed on 23rd March 2016. The details of PO and invoice are as follows: PO No. GCET/ECE/R&D/DST/518/2015-16, dt: 12 Jan. 2016 (Total Cost: Rs.13,87,784/-), Proforma Invoice No.1401, dt:14th Jan. 2016, Invoice No.150278, dt: 24th March 2016, (copies are enclosed with expenditure statement). As per payment terms 50% of the total amount i.e. Rs.6,93,892/- was paid as advance on 18 Jan.2016. Balance amount of Rs.6,93,892/- was paid on 20th April 2016 after successful installation and testing.

2. The HP work station (Model:Z230) and Printer (model: M1136 MFP) were procured and installed on 26th March 2016. The details of PO and invoice are as follows: PO No.GCET/ECE/R&D/DST/557/2015-16, dt:10th March 2016 (Total Cost: Rs. 1,09,935/-), Invoice No. 150103367, dt:26thMarch 2016 (copies are enclosed with expenditure statement). As per payment terms, 50% of the total amount i.e. Rs.54,968/- was paid as advance on 15th March 2016. Balance amount of Rs.54,967/- was paid on 11th April 2016 after successful

(Dr. V. Satya Srinivas)
Signature of PI
Date: 9/5/2016

(Dr. S.Udaya Kumar)
Signature of Head of the Institute (with seal)
Date: 11/5/2016

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), R.R. Dist. (A.P.)-501 301

(B.Mallesham)
Accounts Officer of the Institute
Date: 11/5/2016

Auditor
Date:

For HARI BABU & ASSOCIATES
CHARTERED ACCOUNTANTS
Firm Regn. No. 001064S
(Ch. HARI BABU) Partner
M. No. 022951

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Annexure-II

REQUEST FOR ANNUAL INSTALMENT WITH UP-TO-DATE STATEMENT OF EXPENDITURE

Geethanjali College of Engineering and Technology (GCET), Cheeryal (V), Keesara (M), R.R. District, Hyderabad -501301

Project Title: Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath

1. SERB Sanction Order No and date: SR/FTP/ES-156/2014, dt: 4th September 2015
2. Name of the PI : Dr. V. Satya Srinivas
3. Total Project Cost : Rs.21,50,000/-
4. Revised Project Cost (if applicable): -Nil-
5. Date of Commencement : 23rd September 2015
6. Statement of Expenditure :

(month wise expenditure incurred during current financial year)

Month and Year	Expenditure incurred / committed
September, 2015	-Nil-
October, 2015	Rs.77,141/-
November, 2015	Rs.7,044/-
December, 2015	-Nil-
January, 2016	Rs.6,93,892/- (PO advance 50% to AArjay International Pvt. Ltd., Bangalore for GNSS Receiver)
Febraury, 2016	Rs.10,000/-
March, 2016	Rs.54,968/- (PO advance 50% to Microcare Computers Pvt. Ltd. for workstation and printer) + Rs.4,931/- (conference travel) + Rs.63/- (Bank charges) + Rs.6,93,892/-* (Committed in FY-2015-16 and paid on 20th April 2016 to AArjay International Pvt. Ltd. for GNSS receiver) + Rs.54,967/-* (Committed in FY-2015-16 and paid on 11th April 2016 to Microcare Computers Pvt. Ltd. for workstation and printer) = Rs.8,08,821/-
Total	**Rs.15,96,898/-**

* Vendors due bill amount paid in April 2016.

Grant received in each year:

a. 1st Year : 17 lakhs
b. 2nd Year: -Nil-
c. 3rd Year: -Nil-
d. Interest, if any: Rs.22,735/-
e. Total (a+b+c+d): **Rs.17,22,735/-**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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Annexure-II

UP-TO-DATE STATEMENT OF EXPENDITURE

Geethanjali College of Engineering and Technology (GCET), Cheeryal (V), Keesara (M), R.R. District, Hyderabad -501301

Project Title: Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath

1. SERB Sanction Order No and date: SR/FTP/ES-156/2014, dt: 4th September 2015
2. Name of the PI : Dr. V. Satya Srinivas
3. Total Project Cost : Rs.21,50,000/-
4. Revised Project Cost (if applicable): -Nil-
5. Date of Commencement : 23rd September 2015
6. Statement of Expenditure :

(month wise expenditure incurred during current financial year)

Month and Year	Expenditure incurred / committed
April, 2017	Rs.85,000/-
May, 2017	Rs.196/-
June, 2017	-Nil-
July, 2017	-Nil-
August, 2017	-Nil-
September, 2017	-Nil-
October, 2017	-Nil-
November, 2017	-Nil-
December, 2017	Rs.177/-
January, 2018	-Nil-
February, 2018	Rs.1,98,216/-
March, 2018	Rs.36,583/-
Total	**Rs.3,20,172/-**

Grant received in each year:

a. 1st Year : Rs.17 lakhs
b. 2nd Year: -Nil-
c. 3rd Year: Rs.2,50,000/-
d. Interest, if any: **Rs.35,046/-** (Interest: **Rs.22,735/-** (Fy.2015-16), **Rs.11,095/-** (Fy.2016-17), **Rs.1,216/-** (Fy.2016-17))
e. Total (a+b+c+d): **Rs.19,850,46/-**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Annexure-II

ANNUAL INSTALMENT WITH UP-TO-DATE STATEMENT OF EXPENDITURE

Geethanjali College of Engineering and Technology (GCET), Cheeryal (V), Keesara (M), R.R. District, Hyderabad -501301

Project Title: Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath

1. SERB Sanction Order No and date: SR/FTP/ES-156/2014, dt: 4th September 2015
2. Name of the PI: Dr. V. Satya Srinivas
3. Total Project Cost: Rs.21,50,000/-
4. Revised Project Cost (if applicable): -Nil-
5. Date of Commencement: 23rd September 2015
6. Statement of Expenditure: (*month wise expenditure incurred during current financial year*)

Month and Year	Expenditure incurred / committed
April, 2018	-Nil-
May, 2018	-Nil-
June, 2018	-Nil-
July, 2018	-Nil-
August, 2018	Rs.10,830/-
September, 2018	Rs.31,749/-
October, 2018	Rs.9,603/-
November, 2018	Rs.4,500/-
December, 2018	Rs.31,917/-
January, 2019	Rs.67,557/-
February, 2019	Rs.15,996/-
March, 2019	Rs.10,899/-
Total	**Rs.1,83,051/-**

Grant received in each year:

a. 1st Year: Rs.17 lakhs
b. 2nd Year: -Nil-
c. 3rd Year: Rs.2,50,000/-
d. 4th Year: Rs.1,50,000/-
e. Interest, if any: **Rs.38,605/-** (*Interest:* **Rs.22,735/-** *(Ay.2015-16),* Rs.11,095/- *(Ay.2016-17),* **Rs.1,216/-**(*2017-18),* **Rs.3,559/-** *(2018-19)*)
f. Total (a+b+c+d+e): **Rs. 21,38,605/-**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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A Cloud Computing Emerging Security Threats and Its Novel Trends in Knowledge Management Perception

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Abstract: **Cloud computing is one in all the newest raising innovations of the trendy net and technological landscape. With everybody from the White house to major on-line technological leaders like Amazon associate degreed Google mistreatment or giving cloud computing services it's actually presents itself as an exciting and innovative methodology to store and use Knowledge on the web. Knowledge Management (KM) started over 20 years a gone and its importance were completed by the leading organizations. It's currently thought of as associate degree integral part of any concern. Economic process has competed a major role in however business is conducted and therefore the necessity of innovative metric linear unit grew. The emergence of data and pc Technologies (ICT) created it doable to place innovative ideas into apply in several areas as well as metric linear unit. This paper discusses the trends in Knowledge management manner} new rising technologies have compacted the way Knowledge is managed. One in all the foremost outstanding technologies inside the ICT has been the emergence of Cloud computing that has considerably compact the means IT services are provisioned. With its key characteristics, like on-demand self-service, IT resource pooling, speedy physical property, pay-as-you-go subscription model and reduced IT prices, it's inspired numerous organizations to amend their business methods. the tiny and medium scale organizations will currently avail hosted services for major IT activities as well as metric linear unit through Cloud Computing, that was on the far side their budget before the arrival of Cloud Computing. The cloud setting applications are mentioned intimately with regard to the Knowledge management methods and their combined ability to cater to future desires during this space.**

Key words: **Knowledge Management, Cloud Computing, Innovation.**

I. INTERODUCTION

Cloud computing is one in all the newest raising innovations of the trendy net and technological landscape. with everybody from the White house to major on-line technological leaders like Amazon associate degreed Google mistreatment or giving cloud computing services it's actually presents itself as an exciting and innovative methodology to store and use Knowledge on the web. By giving software package, storage and different services via a web account, Cloud suppliers will greatly cut back prices for little and huge businesses or startups by giving them access to options that will be terribly expensive otherwise.

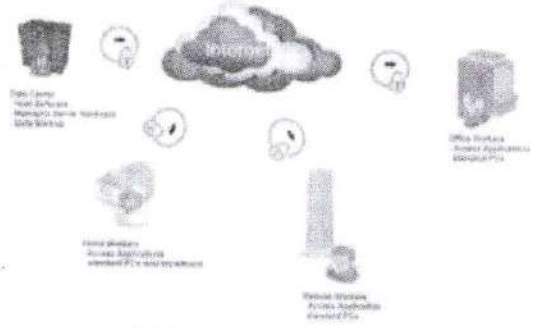

Fig 1 Cloud computing diagram

By giving software package, applications, storage and different services on-line account, Cloud suppliers will greatly cut back prices for small/large businesses and startups by giving them access to advanced options that will be terribly expensive otherwise and much on the far side their means that to get or maintain. They will modify a company's it infrastructure by providing lawman solutions to non technical workers like CRMS (Customer relationship management systems), leads, telephony, accounting apps, contacts and databases. Cloud services like Amazon Cloud and Sales disembodied spirit presently do offer on-line CRM, sales leads, Knowledge and payment services dead one reasonable account counting on the customers' desires.

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RESEARCH PAPER

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AccuracyAssessment of Supervised and Unsupervised Image Classification of Fused Satellite Images

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Abstract:Remote sensing techniques have been extensively utilized for recognition of land use and land cover structures. Land evidence can be definitely composed by classification of satellite images in the perspective of their practice. In this paper study area has been classified into five classes i.e. vegetation, agriculture, water body, open area and urban land by classification of fused images obtained from various fusion techniques. The spatial and spectral determinations of various satellite images make availableimprovedevidence with the encouragementof imageprocessing and image fusion of both multispectral and spatial images. The input images fused together are multispectral image and panchromatic images obtained from IRS-1D satellite utilizing LISS III. Matlab 10.0 software has been used for image processing, fusion and classification of the images. The Principal Component Analysis (PCA), wavelet transform, fuzzy and neuro fuzzy techniques arehave been used for image fusion. The resultant images have been classified using the supervised and unsupervised classification techniques;decision tree classifier and K-Meansalgorithms and evaluationconcerning them in standings of their accuracy.

Keywords:fusion,classification,accuracy,PCA,wavelet,neuro fuzzy

I. INTRODUCTION

Classification of satellite images is essential to identify the outline of satellite data. Nowadays, there may be existent various categories of classification procedures, but it is quite essential to progress their enactment in terms of accuracy percentage. So the projected method primary practice image fusion on multispectral image and its corresponding panchromatic image and combine these two images to acquire the more informative image than any input image utilizing different fusion techniques. Then feature abstraction, image classification and pattern appreciation is completed on that image. This fusion based classification technique is the simpler one which maintains the quality of output.

The objective of image fusion is to incorporate balancing multisensory and multitemporal evidence interested in one new image encompassing evidence, the eminence of which cannot be accomplished else. The word quality, its meaning and measurement depend on the particular application. The image fusion procedures are approximatelycategorized as spatial and transform domain approaches. The spatial fusion procedures are caused with spatial falsification and noise in the output fused image. To incredulous that transform domain image fusion methods such as discrete wavelet transform, contourlet and curvelet are materialized as dynamicinvestigationprovince for image fusion process [1].Alogo classification scheme based on the presence of logo images is projected. The projected classification scheme explores thepractice of overallappearances of logo images for cataloguing. Color, texture, and shape of a logo exclusivelydesignate the universalfeatures of logo images. The numerousarrangements of these features are utilized for classification purpose. Thegroupingcomprisessolitary with particular feature or with image fusion of twostructures or fusion of all three features measured at a time correspondingly. Additional, the system catalogues the logo image into: a logo image with fully text or with fully symbols or containing both symbols and texts. The K-Nearest Neighbour (K-NN) classifier is utilized for classification purpose and the investigationaloutcomesdemonstrated that the furthermostauspicious results are obtained for fusion of features[2].Comparison ofnumerous image fusion procedures have remained deliberated and their precisions have been assessed ontheir respective image classification process. LISS III multispectral data and panchromatic data have been utilized in this paper to establish the improvement and accuracy evaluation of fused imageabove the original images obtained from sensors by expending ERDAS image processing software[3].A proposed method emphases on two foremost concerns; primary one is the influence of grouping of multi-sensor images on the supervised learning classification accuracy expending Segment Fusion (SF). The subsequent matter efforts to commence the learning of supervised machine learningclassification procedure of remote sensing images by using classifiers have been assessed on their respected classification to select the finest procedure for classification of remote sensing images. QuickBird multispectral (MS) and panchromatic (PAN) images have been utilized in this method to establish the improvement and accuracy evaluation of fused image in excess of the original images using ALwassaiProcess software.According to investigational outcome of this work, that the assessmentoutcomesdesignate the supervised classification outcomes of fusion image, whichproducedhealthier than the MS image. Euclidean classifier based results arehealthy and deliversimprovedoutcomesover the other classifiers, in spite

Research Article

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Comparison of Discrete Wavelet Transform (DWT), Discrete Cosine Transform (DCT) and Stationary Wavelet Transform (SWT) based Satellite Image Fusion Techniques

Ch Ramesh Babu[1], D. Srinivasa Rao[2]

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ABSTRACT

The aim of the image fusion is to combining evidence from different images; Multispectral (MS) and Panchromatic (PAN) images acquired from different sensors of the same interpretation in directive to convey enhancedspectral and spatial information as well. In this paper discrete wavelet transform (DWT) and two specializations of discrete cosine transform (DCT); i)DCT varianc,ii) consistency verification with DCT variance fusion techniques are implemented and compared with the proposed methodology for image fusion named stationary wavelet transform (SWT). Fused results obtained from these fusion approaches are assessed through typical evaluation parameters. Fused outcomes obtained from proposed SWT outperforms DWT and two flavors of DCT based fusion approaches. The shift invariant property of SWT produces improved spectral and spatial evidence in the fused image followed by fused grades accomplished from DCT based fusion approaches. The discrete cosine transforms (DCT) grounded approaches of image fusion are further proper and performance oriented in real time applicationsby means of DCT founded principles of static images. Conclusion through this work is a glowing systematic practice for fusion of multi-focus images based on SWT is presented and proved that SWT based fused results surpass other fusion approaches.

Key Words: DWT, DCT, SWT, Variance, Consistency verification

INTRODUCTION

Multisensor image fusion is the method of conjoining significant evidence from two or more images addicted to a one image.The resultant image determined as an additional useful information than at all of the participated images.In remote sensing solicitations,the accumulative obtainability of planetary accepted sensors provides a inspiration for various image fusion procedures. Numerousconditions in image processing need great spatial and extraordinary spectral information in a particular image. Furthermost of the obtainableutensils is not proficient of producing such informationinfluentially. Image fusion methods permit the combination of alteredevidencefoundations. The output image from fusion may obligate harmonizing dimensional and supernatural information features. However, the average image fusion procedures can change the spectral evidence of the multispectral data while combining input images through fusion process.

[1] grants two elementary fusion areas, explicitly spatial domain and transform domain. Principal component analysis (PCA) which is dimensional province technique and discrete cosine transform (DCT), discrete wavelet transform (DWT), stationary wavelet transform (SWT), non-sub sampled contourlet transform (NSCT), and complex contourlet transform (CCT) which are transform domain procedures. Enactmentmeasures are executed to assess and authenticate the enactment of image fusion procedure. Investigationaloutcomesdirect that the image fusion techniquefounded on complex contourlet transform (CCT) is improved than formerapproaches.

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Performance Analysis of a Gaussian Mixture based Feature Selection Algorithm

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Abstract—Feature selection for clustering is difficult because, unlike in supervised learning, there are no class labels for the data and, thus, no obvious criteria to guide the search. The work reported in this paper includes the implementation of unsupervised feature saliency algorithm (UFSA) for ranking different features. This algorithm used the concept of feature saliency and expectation-maximization (EM) algorithm to estimate it, in the context of mixture-based clustering. In addition to feature ranking, the algorithm returns an effective model for the given dataset. The results (ranks) obtained from UFSA have been compared with the ranks obtained by Relief-F and Representation Entropy, using four clustering techniques EM, Simple K-Means, Farthest-First and Cobweb.For the experimental study, benchmark datasets from the UCI Machine Learning Repository have been used.

Keywords-*gaussian mixtures,clustering,unsupervised,feature selection,relief-F*

*****

I. INTRODUCTION

In machine learning, feature selection, also known as variable selection, feature reduction, attribute selection or variable subset selection, is the technique of selection a subset of relevant features for building robust learning models.

Feature selection is a must for any data mining product. That is because, when you build a data mining model, the dataset frequently contains more information than is needed to build a model. For example, a dataset may contain 500 columns that describe characteristics of customers, but perhaps only 50 of those columns are used to build a particular model. If you keep the unneeded columns while building the model, the clusters will not be well defined and more storage space is required for the completed model.

Feature selection[5] works by calculating a score for each attribute, and then selecting only the attributes that have the best scores. You can adjust the threshold for the top scores. Feature selection is always performed before the model is trained, to automatically choose the attributes in a dataset that are most likely to be used in the model.

There are various methods for feature selection. The exact method for selecting the attributes with the highest value depends on the algorithm used in your model, and any parameters that you may have set on your model. Feature selection is applied to inputs, predictable attributes, or to states in a column. Only the attributes and states that the algorithm selects are included in the model-building process and can be used for prediction. Predictable columns that are ignored by feature selection are used for prediction, but the predictions are based only on the global statistics that exist in the model.

II. BACKGROUND

In statistics, a Mixture Model is a probabilistic model for representing the presence of sub-populations within an overall population. This model does not require that an observed data-set should identify the sub-population to which an individual observation belongs.

Formally a mixture model corresponds to the mixture distribution that represents probability distribution of observations in the overall population. However, while problems associated with "mixture distributions" relate to deriving the properties of the overall population from those of the sub-populations, "mixture models" are used to make statistical inferences about the properties of the sub-populations given only observations on the pooled population, without sub-population-identity information.

The methods which can be used to implement such mixture models[1] can be called as unsupervised learning or clustering methods.

A. General mixture model

A typical finite-dimensional mixture model is a hierarichal model consisting of the following components:

- N random variables corresponding to observations, each assumed to be distributed according to a mixture of K components, with each component belonging to the same parametric family of distributions (eg, all Normal) but with different parameters.
- N corresponding random latent variables specifying the identity of the mixture component of each observation, each distributed according to a D-dimensional categorical distribution.
- A set of L mixture weights, each of which is a probability (a real number between 0 and 1), all of which sum to 1.
- A set of L parameters, each specifying the parameter of the corresponding mixture component. In many cases, each "parameter" is actually a set of parameters. For example, observations distributed according to a mixture of one-dimensional Gaussian distribution will have a mean and variance for each component. Observations distributed according to a mixture of D-dimensional categorical distributions (e.g., when each observation is a word from a vocabulary of size D) will have a vector of D probabilities, collectively summing to 1).

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SECURED DISTRIBUTED ACCOUNTABILITY FOR DATA SHARING IN CLOUD

Dr Ch. Ramesh Babu*[1], Dr Md. Mastan[2] & Dr B.V Swathi[3]
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DOI: 10.5281/zenodo.839113

ABSTRACT

We urge a peculiar way, in particular Cloud Information Accountability (CIA) system, in view of the thought of data responsibility. Antithetical to security insurance advancements which are based on bury the chance or forget it, asset liability looks after how to minimize the usage of data which can be tracked. Our proposed CIA system gives end-to end control in an exceptionally disseminated manner. One of the primary inventive elements of the CIA structure lies in its scope of keeping up incompetent and capable responsibility that consolidates parts of get to force, use restriction and verification. By methods for the CIA, information proprietors can track not just regardless of whether the administration matched compliance are to be valued, moreover uphold get to and discharge dominance leads as needed. Related with the responsibility highlight, we additionally create two particular modes for examining: push mode and force mode. The push mode alludes to logs being intermittently sent to the information proprietor or partner while the draw mode alludes to an option access whereby the end user (or another approved gathering) can recover the logs as required.

KEYWORDS: Cloud computing, cloud service, cloud security, computer network, distributed computing.

I. INTRODUCTION

Cloud Computing gives brief view about the resource usage and communication display for the industrial experts, by considering progressive flexibility and regular constructive resources. Till now, there are various bizarre employment and respective distributed computing authority, including various cloud providing enterprise platforms. View of the administrations are dreamy from the clients doesn't need to be part should be specialists of innovation foundation. Adding to this the purchaser doesn't have an idea about hosting and transforming their propaganda. While studying about it the accommodation lead by the advanced innovation, purchasers added fear over falling authority of their own report. The report prepared on cloud are frequently deployed, precise numerous concerns analyzed with liability, counting the analysis of by and by attributable statistics. Similar feelings of trepidation are turning into a noteworthy obstruction to the ample appropriation of cloud control.

This cloud display advances accessibility and is made out of five basic attributes, three administration models, and four arrangement models. The qualities of shared computing consolidate on appeal ascetic asset, wide ranging scheme get to, aid merging, fast resilience and systematic governance. The distributed computing administration representations are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Sending models of cloud administrations are open cloud, private cloud, group cloud, mixture cloud.

To ease end user' worries, it is fundamental to give a dominant structure to end users to view the discharge of their particulars in the cloud. For instance, end users should have the scope to assure that their data are dealt with as indicated by the administration matched capability set a few minutes trace on for authorities in the cloud. Customary get to balanced access generated for seal areas, for example, storage bases and functional frameworks, or techniques using an incorporated server in dispersed conditions, are not reasonable, because of the accompanying components portraying cloud positions.

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ICMPC 2017

Analytical Model Application for Prediction of Mechanical Properties of Natural Fiber Reinforced Composites

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Abstract

Different analytical models are often used for predicting theelastic properties of the synthetic fiber reinforced polymer composites. However, the prediction of the elastic properties of the natural fiber reinforced compositeshasn't been studied to a required extent. In this study, the application of different mathematical and analyticalmodels such as the rule of mixtures, inverse rule of mixtures and Chamis model...etc., that are present for predicting the mechanical properties of thefiber–polymer composite material was presented. Apineapple fiber reinforcedepoxy composite was prepared and experimental analysis was performed to predict the mechanical properties.Then acomparison was made between the resultsof the experiment and existing mechanical models and finite element analysis to find which theory is good at predicting the properties of the natural fiber reinforced composite materials.

Selection and/or Peer-review under responsibility of 7th International Conference of Materials Processing and Characterization.

Keywords: PALF fiber composite, Mechanical Models, FEM, Experimental Analysis.

1. Introduction

The research towards the development of new composite materialshas been going on for many years and is still continuing. Most of the research was on developing new fiber composites based on the artificial fibers. But in the recent years rising concerns about the environmental pollution, global warming effect, waste generation & management, growing burden on the fossil fuel reserves has led to the development of natural fiber based composite materials. There are some natural fibers whose strength is equivalent to that of the existing artificial fibers which have contributed to the development in this area.

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Selection and/or Peer-review under responsibility of 7th International Conference of Materials Processing and Characterization.

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Analysis of Inner Rotor in a Georotor

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**Assistant Professor, Department of Mechanical Engineering, Geethanjali College of Engineering & Technology, Hyderabad-India.

Abstract— For any gas turbine engines, various systems are involved for the safe and reliable operation, in that oil system plays a vital role for the engine lubrication .Oil pump is the most significant equipment as a part of engine oil system.
The main function of oil pump in the engine is to supply lubricating oil to various rotating and sliding parts of an engine in order to prevent the wear & tear, excessive heat generated during the engine operation
The oil pump works on the principle of geo rotor (similar to internal gear arrangement) which is a positive displacement pump. The oil pump develops required pressure greater than the bearing chamber pressure and flow for maintaining the bearing temperature in the engine. The oil pump geo rotor is driven by the engine power through the gear box and quill shaft connected to oil pump driven shaft.
In this research we designed the geo rotor with standard measurements by using pro/e software. Also analysis should be done by taking different materials of Vonmises Stress, Strain& Total Deformation

Keywords—*Geo Rotor; Design;Vonmises Stress & Strain; Analysis*

I. INTRODUCTION

The geo rotor is a positive displacement pumping unit compared with external and internal gear pumps; it keeps an advantage of less components, simple structure, low noise and low ripple of flow rate. Therefore it is widely used in applications of lubricating systems of on-road or off-road engines.

It mainly consists of inner rotor, outer rotor. The inner rotor lies inside the outer rotor and it positions itself at a fixed eccentricity from the outer rotor inside the housing.

Input torque is to drive the inner rotor and outer rotor rotates with it since they contact each other at less several points on their geometric profile.Geo rotors may be mounted directly on an existing shaft.gerotors can handle any flowing substances from air to hot melt glue. A single geo rotor set accommodates multiple flow streams operating at different pressures.

II. DESIGN OF GEOROTOR

Georotor was designed using Pro-E software with the specified dimensions

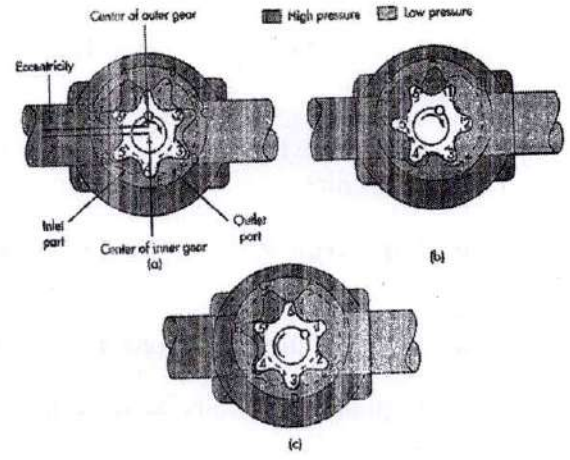

Fig-1

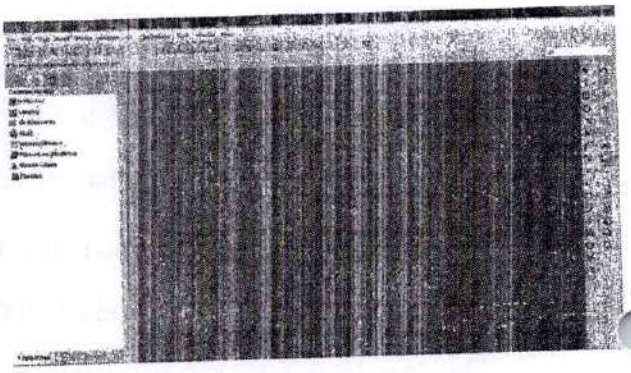

Fig-2

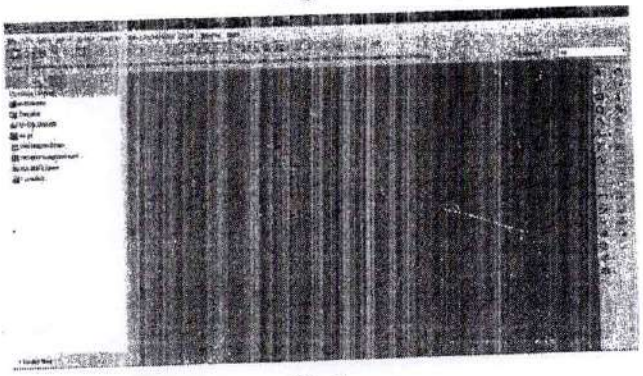

Fig-3

JOURNAL OF CRITICAL REVIEWS

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Performance of 4S-SingleDiesel Engine Using Jamun Seed Methyl Ester Oil (JSMEO) with different piston Configurerations and injection pressures

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ABSTRACT: Non acceptable oil crops are being grown solely for biodiesel creation. An irregular strategy is to raise a food yield and use the waste material for biodiesel. Jamun Seed oil (JSO) is regular non satisfactory oil that is introduced in dry land nations the examination around there to create as a substitute for petrochemicals in minute. JSO was set up from oil process extraction by using n-hexane. The transesterification strategy for production of Jamun Seed Methyl Ester Oil (JSMEO) has been researched. The assembling of far over the ground quality jamun seed biodiesel achieve from the transestification alongside methanol, KOH go about as impetus. The furthest utilized single chamber 4S fluid cooled unequivocal infusion diesel motor is chosen to test. The testing of JSMEO have been complete on three distinctive cylinder head geometry by shift the motor working boundaries. In this exploratory work, the motor execution are determinate by methods for JSMEO as the essential fuel and diesel has the optional fuel of the motor and the results are seen as the test examination.

KEYWORDS: Transesterification, JSO, Jamun Seed Methyl Ester Oil (JSMEO),

I. INTRODUCTION

The normal Diesel includes an important venture in the evolved economic system of every state. The a ways over the ground power calls for in the enterprise international and ordinary usage of non-renewable electricity resources are usually vital to brisk intake of petroleum spinoff property just as nature corruption. The undignified air distinction to emanations which are primary ominous impact of oil associated energizes. In this angle require steady pursuit and continual improvement in sustainable energy supply initiation which are nature well disposed. Biomass causes, mainly eatable and non palatable oils, have captivated a variety of consideration rather vitality gracefully. In contrast with Diesel, biodiesel have no longer so much outflows but as a substitute greater effective ignitions. Discharges of carbon monoxide and smoke particulate trouble lessen via 45%, hydrocarbon emanations lessens by using 70% besides NOx contaminations marginally increment by using 10% with 100% of B100 as a fuel1. The obsession of carbon dioxide from biodiesel is little contrasted with Diesel gasoline. It indicates biodiesel decreases nursery effect while contrasted with mineral Diesel fuel2,three. Biodiesel has a hit glimmer point, which gives it greater cozy to preserve up. Agarwal et al.4,5 said that biodiesel affords fantastic greasing up homes that may lessen part wear and improve motor life. In excess of more than one explores have parted with, the analysis consequences of B100 residences can be upgraded with the aid of transesterification, and this approach is picked for modern research.

Transesterification is a compound manner of reaction on this liquor responds with the unsaturated fats triglycerides in nearness of an impetus KOH. The liquor responds with triglycerides and structures a glycerol and esters. The jamun seed methyl esters oil transesterification can be catalyzed by means of both homogeneous impetuses and heterogeneous impetuses. Homogeneous impetuses carries antacids and acids. The maximum generally applied salt impetuses are NaOH, KOH, carbonates and the touching on sodium and moreover potassium alkoxides, as an example, sodium methoxide, sodium ethoxide, sodium propoxide and sodium butoxidel 6,10. Freedman et al.7 explored the impact of various obstacles at the immaculateness of biodiesel delivered. Sulfuric corrosive, sulfuric corrosive and hydrochloric corrosive are normally utilized as impetuses in the corrosive

IMPLEMENTATION OF HIGH SPEED VEDIC BCD MULTIPLIER USING VINCULUM METHOD

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Abstract: This paper presents a BCD Multiplier that operates on Vedic Mathematics called Vedic sutras. It uses a method called Vinculum which converts higher complex numbers into its simplest form. In Decimal number system the numerials 6,7,8,9 are called high complex numbers and numbers consisting of 6,7,8,9 are converted into 4,3,2,1 there by total number or any number is between 1 to 5 digits only for any arithmetic operation. This feature reduces Carry generations and Carry propagations there by performance parameter like delay reduces especially in adders and multiplier structures. We choosen an arithmetic operation multiplication and it is compared with Conventional Multiplier [1] [2] [3] and Vedic Multiplier[5] and it has been observed that improvement in speed is 83.5% in case of conventional multiplier and 47.8% in case of vedic multiplier which is suitable for High Speed Applications.

The Architecture is implemented using Xilinx Vertex 4 FPGA and the same is done using Cadence Digital Encounter Tools of TSMC180nm Technology. The results indicate that the proposed BCD multipliers is very efficient in terms of speed when compared to decimal multipliers implemented with direct manipulation of BCD numbers.

Key words: BCD multiplier, High speed, Vedic Mathematics, Vinculum multipliers.

1. Introduction:

Decimal Arithmetic plays a very vital role in many Finance, Business and Commercial Applications for which binary arithmetic is not suitable. From the last decade lot of research is going on decimal arithmetics and Decimal Floating point number systems where most of research papers or literature is on conversion of Decimal numbers into Binary numbers and from Binary to Decimal numbers with various Encoding and Decoding methods [7] [8] [10]. Small attempt was done in a different method using Vedic mathematics which is an emerging technology in engineering branches where we can perform all decimal arithmetic operations in a simple and easiest method. It was proved theoritically that vedic method is faster than conventional method mathematics and most of researches are motived in this angle for engineering applications.Vedic Mathematics holds good for both binary and decimal number systems [5] [14] [15].

The outline of the paper is arranged as follows. In Section 2 Vedic Mathematics and Sutras related to multiplication is presented. In Section 3 Concepts of Vinculum numbers, its Algorithm with examples is discussed. In Section 4 Detailed description of Proposed Vedic BCD Multiplier with Conversion Logic, Partial Product generation and its Adder structure is explained. Simulation and Synthesis results are discussed in Section 5 and Conclusion with Future scope in Section 6.

2. Vedic Mathematics and Sutras related to multiplication:

Among four Vedas Rig Veda is the root for Vedic mathematics which is an ancient method. It consists of 16 basic formulas also called sutras or aphorisms and 14 sub formulas. They were presented by a Hindu scholar and mathematician, Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja, during the early part of the 20th century [1]. The word "veda" means "knowledge" in sanskrit. Famous Indian Mathematicians like Aryabhatta, Brahmagupta, and Bhaskara II made their contributions to geometry, algebra, computational mathematics like irrational

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COMPRESSOR BASED 8x8 BIT VEDIC MULTIPLIER USING REVERSIBLE LOGIC

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Abstract: **Reversible logic gates became very important and computing paradigm having its applications in low power CMOS technologies and Quantum computing [5]. Reversible logics are used to reduce the depth of the circuits [6]. This paper introduces a new architecture of 4:2 Compressorbased Vedic 8x8 bit Multiplier using reversible logic and is compared with conventional multipliers using Reversible logic and it was observed that the parameters like Hardware Complexity, power and Delay are improved over other Reversible multipliers. The design is simulated, synthesized and power estimation was done using TSMC 180nm technology using Cadence Digital tools.**

Keywords: Reversible gates, Compressors, Vedic Multiplier, Low power

1. INTRODUCTION

Vedic Mathematics is a system of reasoning and mathematical working based on ancient Indian teachings called Veda[10]. It is fast, efficient and easy to learn and uses all arithmetic and algebraic operations which are accepted by worldwide. The origin of Vedic mathematics is from Vedas and to more specific Atharva Veda which deals with Engineering branches, Mathematics, sculpture, Medicine and all other sciences which are ruling today's world. Vedic mathematics, which simplifies arithmetic and algebraic operations, can be implemented both in decimal and binary number systems [10]. It is an ancient technique, which simplifies multiplication, division, complex numbers, squares, cubes, square roots and cube roots. Recurring decimals and auxiliary fractions can be handled by Vedic mathematics. This made possible to solve many Engineering applications, Signal processing Applications, DFT's, FFT's and many more.[12][13]. Vedic mathematics consists of 16 sutras (formulas) and 13 sub sutras. We used UrdhvaTiryagbhyam method for multiplication process.

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The paper is organized as below. In section I we discuss algorithm of vedic multiplier for an 8 bit multiplication. Section II deals with Reversible Logics, Section III deals with Compressors and its structures and Section IV deals with proposed Multiplier using Compressor and Reversible logics, Section V Results and comparisons and Section VI Conclusions in terms of its Speed and Power

1.1 Line Diagram for 8bit Vedic multiplier

Let us consider the multiplication of 2 binary numbers. Line diagram for the multiplication is shown as below:

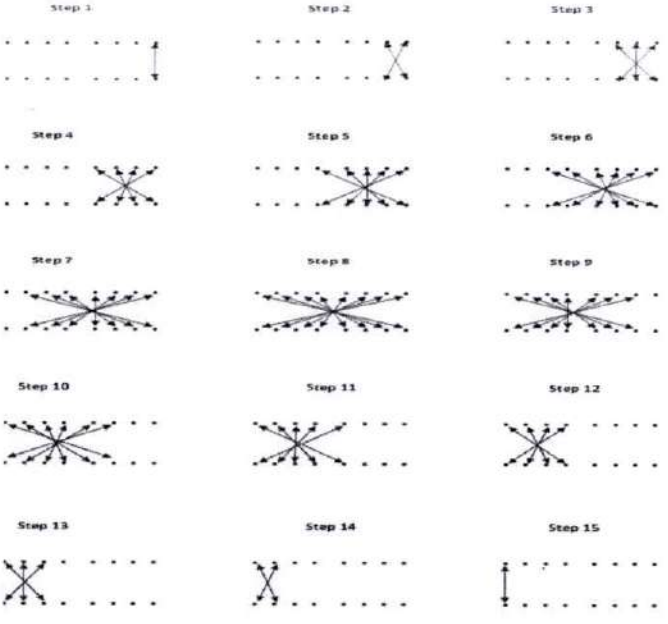

Fig 1: 8-bit Vedic Multiplier line diagram

Figure 1 explains how each bit is multiplied and final product is obtainedsimply by appending from step 1(LSB) to step 15(MSB).

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Area-Delay-Power Efficient Booth Encoded Reversible Multiplier Using Compressors

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Abstract

Reversible logic gates became very important and promising technology having more applications in low power CMOS design, Quantum computing, Optical computing and Nano Technology. The basic set of gates like AND, OR, XOR are not reversible. A se reversible gates has been introduced by various researchers. Few basic reversible gates are Feynman, Toffoli, TSG, Fredkin, Per etc. Theoretically it has been proved that energy dissipation would not occur if a computation is carried out in a reversible way. Th paper proposes a Novel reversible Radix 4 Booth Encoded Wallace Tree multiplier using 4:2 compressors, 5:2 compressors.

Keywords

Reversible gates, Compressors, Low power, Booth Encoder.

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Computational Cost Reduction for *N*+2 Order Coupling Matrix Synthesis Based on Desnanot-Jacobi Identity

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ABSTRACT Matrix inversion is routinely performed in computational engineering, with coupling matrix filter synthesis considered here as just one of many example applications. When calculating the elements of the inverse of a matrix, the determinants of the submatrices are evaluated. The recent mathematical proof of the Desnanot–Jacobi (also known as the "Lewis Carol") identity shows how the determinant of an $N+2$ order square matrix can be directly computed from the determinants of the $N+1$ order principal submatrices and N order core submatrix. For the first time, this identity is applied directly to an electrical engineering problem, simplifying $N+2$ order coupled matrix filter synthesis (general case, which includes lossy and asymmetrical filters). With the general two-port network theory, we prove the simplification using the Desnanot–Jacobi identity and show that the $N+2$ coupling matrix can be directly extracted from the zeros of the admittance parameters (given by $N+1$ order determinants) and poles of the impedance parameters (given by the N order core matrix determinant). The results show that it is possible to decrease the computational complexity (by eliminating redundancy), reduce the associated cost function (by using less iterations), and under certain circumstances obtain different equivalent solutions. Nevertheless, the method also proves its practical usefulness under constrained optimizations when the user desires specific coupling matrix topologies and constrained coefficient values (e.g, purely real/imaginary/positive/negative). This can lead to a direct coupling matrix constrained configuration where other similar methods fail (using the same optimization algorithms).

INDEX TERMS Coupling matrix, determinant, filter synthesis.

I. INTRODUCTION

In computational engineering, matrix inversion is routinely performed and this requires the calculation of its determinant. While generally considered a mature subject, there is still scope for new algorithms [1] and methods [2], which is critical for simplifying computational effort and ultimately speeding up simulation time.

For an N order filter, N order coupling matrix filter synthesis requires N order matrix inversion [3], [4]. The $N+2$ coupling matrix, on the other hand, includes an extra pair of rows (top and bottom) and extra pair of columns (to the left and right) surrounding the N order core submatrix, to describe all the couplings between the source and load and the different nodes of the circuit [5], [6]. The $N+2$ order coupling matrix synthesis can start from the transversal coupling matrix for the lossless case [6] and lossy case [7], which can be obtained directly from the poles and residues of the short-circuit admittance or Y-parameters. Since transversal coupling is not practical for physical implementations, the authors of [6], [7] search for a new coupling matrix that shares the same target frequency response. Classical synthesis/reconfiguration techniques employ similarity transformations; based on either rotations [6], [8] or reflections [9] for reciprocal lossless filters (having symmetrical real coupling matrices), hyperbolic rotations [10], [11] or hyperbolic reflections [12] for reciprocal lossy filters (having symmetrical complex coupling matrices). These transformations are reapplied until the coupling matrix is transformed into the desired filter topology. The drawbacks with these methodologies is that

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Research Article

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Common Random Fixed Point Theorems in Probabilistic Metric Spaces

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Abstract:
In this paper we prove common fixed point theorems in probabilistic metric space by using the concept of β- compatible mapping and weakly compatible mapping in randomized fuzzy metric space.

Key words: Common fixed point, fuzzy metric space, compatible maps, and weakly compatible continuous t-norm, randomized fuzzy metric space.

Introduction

Probabilistic functional analysis has emerged as one of the important mathematical disciplines in view of its role in analyzing Probabilistic models in the applied sciences. The study of fixed point of random operator forms a central topic in this area. Random fixed point theorem for contraction mappings in Polish spaces and random Fixed point theorems are of fundamental importance in probabilistic functional analysis. There study was initiated by the Prague school of Probabilistics, in 1950, with their work of Spacek [15] and Hans [5,6]. For example survey are refer to Bharucha-Reid[4]. Itoh [8] proved several random fixed point theorems and gave their applications to Random differential equations in Banach spaces. Random coincidence point theorems and random fixed point theorems are stochastic generalization of classical coincidence point theorems and classical fixed point theorems. Sehgal and Singh [14], Papageorgiou [12], Rhoades, Sessa, Khan [13] and Lin [11] have proved differential Stochastic version of well known Schauder's fixed point theorem. Recently, Beg and Shahzad [3] studied the structure of common fixed point and random coincidence Points of a pair of compatible random operators.

In this paper we prove common fixed point theorems in probabilistic metric space by using the concept of β- compatible mapping.

First we give some basic and important definitions related to this paper.

Definition 1.1.1. Let X be any set. A fuzzy set in X is a function with domain X and values in [0,1].

Definition 1.1.2. A binary operation $\star : [0,1] \times [0,1] \to [0,1]$ is continuous $t-$norm if $\star$ is satisfying the following conditions:

1.1.2 (a) $\star$ is commutative and associative,

1.1.2 (b) $\star$ is continuous,

1.1.2 (c) $a \star 1 = a$ for all $a \in [0,1]$

1.1.2 (d) $a \star b \leq c \star d$ whenever $a \leq c$ and $b \leq d$,

for all $a, b, c, d \in [0,1]$

Examples of $t-$norm are $a \star b = \min\{a, b\}$ and $a \star b = ab$.

Definition 1.1.3. A triplet $(X, M, \star)$ is a fuzzy metric space whenever X is an arbitrary set, $\star$ is continuous $t-$norm and M is fuzzy set on $X \times X \times [0, \infty^+)$ satisfying, for every $x, y, z \in X$ and $s, t > 0$, the following condition:

1.1.3 (a) $M(x, y, t) > 0$

1.1.3 (b) $M(x, y, 0) = 0$

1.1.3 (c) $M(x, y, t) = 1$ iff $x = y$

1.1.3 (d) $M(x, y, t) = M(y, x, t)$

1.1.3 (e) $M(x, y, t) \star M(y, z, s) \leq M(x, z, t + s)$

1.1.3 (f) $M(x, y, \cdot) : (0, \infty^+) \to [0,1]$ is continuous.

We note that, $M(x, y, t)$ can be realized as the measure of nearness between x and y with respect to t. It is known that $M(x, y, \cdot)$ is non decreasing for all $x, y \in X$. Let $M(x, y, \star)$ be a fuzzy metric space for $t > 0$, the open ball

$$B(x, r, t) = \{y \in X: M(x, y, t) > 1 - r\}.$$

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Non-Linear Taft Relationship applied to surface tensions of aliphatic acids: Inter-molecular hydrogen bonding versus intra-molecular hydrogen bonding

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ABSTRACT

Hammett and Taft equations in their most basic forms are linear free energy relationships between standard free energies of two reaction series. Therefore any chemical or physical property inherently associated with any of the thermodynamic property like enthalpy H, free energy G, internal energy E or entropy S are subjected to substituent effects. One such physical property is the surface tension. Surface tension is a kind of surface free energy (G) of any liquid and is also supposed to be effected by the structure of liquids. Hence the present study has been selected to see the effect of substituents on surface tension of some aliphatic acids. The quick glance at the present study ended up with a non-linearity of Taft equation to the surface tension data of aliphatic acids. Hence Non-Linear Taft Relationship (NLTR) was applied to surface tensions (γ) of some aliphatic acids. The non-linearity of log γ versus Taft σ* correlation was explained in terms of inter-molecular hydrogen bonding versus intra-molecular hydrogen bonding and in terms of steric effects.

1. Introduction

Though the Hammett [1] and Taft [2] equations are nearly more than seventy five years old, they enjoyed outstanding application for predicting the organic reaction mechanisms among physical organic chemists. Ever since the Hammett [1] and Taft [2] equations were developed, there were several hundreds of reactions in literature, for which the Hammett and Taft reaction constants (ρ and ρ*) were reported. Though the application of Linear Free Energy Relationships to chemical reactions [3–24] and physical properties [25–30] is quite promising in nature, application of non-linear Taft equation to the reactions of benzyl bromide with N-substituted benzyl amines is first of its kind in literature and of recent origin from our laboratory [31]. In the present article we have tried to apply non-linear Taft equation to physical properties like surface tensions of some aliphatic acids. To our knowledge the present study is first of its kind in literature. The non-linearity of Taft correlation was explained in terms of inter-molecular hydrogen bonding versus intra-molecular hydrogen bonding of the aliphatic acids and in terms of steric effects.

2. Experimental data source

Data on surface tensions of aliphatic acids is from reference [32] and references cited therein. The Taft σ* values of alkyl substituted acids are from references [33,34] and of halogen substituted acids are from reference [35]. Thermo chemical data is from reference [36]. All the linear correlations were done using the KaleidaGraph software, Reading, PA, USA.

3. Discussion

A molecule in the bulk of a liquid is completely surrounded by other molecules; therefore it is attracted equally in all directions. While a molecule on the surface has an attraction inward because the number of molecules per unit volume is greater in liquid than in vapor because vapor is a dilute system. Due to this inward pull, the surface of the liquid always tends to contract to have minimum possible area. In order to extend the area of the surface, it is necessary to do work, to bring molecules from the bulk of the liquid into the surface, against the inward attractive force. The work required to increase the surface area by 1 sq. cm is called surface free energy [37].

As a result of this tendency to contract, a surface behaves as if it were in a state of tension. If a cut were made along any line in the surface, a force would have to be applied to hold the separate portions of the surface together. This force is proportional to the length of the cut and its value per unit length is called surface tension or interfacial tension (γ).

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ARTICLE

Thermal Effects of Two Immiscible Fluids in a Circular Tube with Nano Particles

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The paper deals with a theoretical investigation of thermal effects of two immiscible fluids in a circular tube with nano particles. The closed form expressions for pressure drop, time averaged flux, velocity in the peripheral region as well as in the core regions, frictional force and mechanical efficiency have been investigated. Effects of different physical parameters like micropolar parameter, coupling number, viscosity ratio, mean radius of the central layer, Brownian motion parameter, thermophoresis parameter, local temperature Grashof number as well as local nano particle Grashof number on pressure drop characteristics, frictional force, mechanical efficiency, heat transfer coefficient, mass transfer coefficient, velocity profiles in the core region and streamline patterns of the fluid are studied. The computational results are presented in graphical form.

KEYWORDS: Peristalsis, Nano Particles, Homotopy Perturbation Method, Peripheral Layer, Heat Transfer Coefficient, Mass Transfer Coefficient.

1. INTRODUCTION

The peristaltic transport has prime importance for transporting of fluid from lower pressure region to higher pressure region. It is because of the contraction of muscles travelling in waves along a tube like structure. It is due to the presence of neuron-muscular properties of tubular smooth muscles in physiological processes. This kind of activity is generally prevalent in the gastrointestinal, urinary, reproductive tracts, small blood vessels, intestines, lymphatic vessels and many other glandular ducts in a living body. The industrial applications of this mechanism is observed and used in sanitary and corrosive fluid transport, in rollers, finger pumps, hose pumps and blood pump in heart lung machine. This phenomenon of transporting toxic liquid is used in nuclear industry.

In view of its importance, many researchers investigated peristaltic transport of Newtonian and non-Newtonian fluids under various conditions. Peristaltic transport has been studied by Fung and Yih.[1] Shapiro et al.[2] studied peristaltic pumping with long wavelengths at low Reynolds number. Prasad and Radhakrishnamacharya[3] investigated effect of peripheral layer on peristaltic transport of a couple-stress fluid. Hayat et al.[4] studied peristaltic transport of Carreau-Yasuda fluid in a curved Channel with slip effects. Flow of a Jeffery fluid through a porous medium in narrow tubes was studied by Santhosh et al.[5]

Micropolar fluid is a non-Newtonian fluid that belongs to a class of fluids with non-symmetrical stress tensor and is referred to as polar fluid. It represents a fluid consisting of randomly scattered particles suspended in a viscous medium. It is realized that micropolar fluid accounts for the rotation of fluid particles by means of an independent kinematic vector called microrotation vector (Eringen,[6]). As a result micropolar fluid model is more appropriate to investigate the behavior of lubricants, colloidal suspensions, polymeric fluids, liquid crystals and physiological fluids. Peristaltic transport of a micropolar fluid was studied by Devi and Devanathan.[7] Prasad et al.[8] studied peristaltic pumping of a micropolar fluid in an inclined tube. Slip effect on peristaltic transport of micropolar fluid was investigated by Chaube et al.[9] Wang et al.[10] studied peristaltic motion of a magneto hydrodynamic micropolar fluid in a tube. Effect of Slip Velocity on Peristaltic transport of a magneto-micropolar fluid through a porous non-uniform channel was investigated by Shit and Roy.[11] MHD peristaltic transport of a micropolar fluid in an asymmetric channel with porous medium was investigated by Satyanarayana et al.[12]

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Full Paper

Experimental and Quantum Mechanical Study of Nucleophilic Substitution Reactions of *meta*- and *para*-Substituted Benzyl Bromides with Benzylamine in Methanol: Synergy Between Experiment and Theory

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This work involves the experimental and theoretical study of the nucleophilic substitution of *meta*- and *para*-substituted benzyl bromides with benzylamine. Conductometric rate experiments confirm the applicability of the Hammett linear free-energy relationship to this system. To gain a deep understanding of the physical chemistry at play, a quantum mechanical study of the reaction is also conducted. The quantum mechanical calculations not only reproduce the experimental free energy of activation, but also provide greater insights at the molecular and atomic level. Isolation of the calculated transition state structure and application of the Hammett equation to its electronic, structural, and energetic properties are studied.

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Introduction

Since its genesis, a massive body of experimental work has emerged related to Hammett's equation[1,2] applied to reaction mechanisms in chemistry.[3–12] The Hammett equation describes the effect of substituents (at *meta* and *para* positions) linked to an aromatic series on the reaction rate and equilibrium constants relative to the substituents attached at *meta* and *para* positions of ionization of benzoic acids in water at 25°C. Furthermore, the Hammett constants were applied to certain fundamental properties, such as steric effects, nucleophilicity, and solvent effects, and structure–reactivity correlations were developed.[13–15] In the present work, we apply the Hammett relation not only to the reaction under study in the conventional sense, i.e. plot of experimentally and theoretically obtained reaction rate constants versus the Hammett σ values, but also to various theoretically obtained properties of the calculated transition state structure.

In an earlier study,[16] we conducted an experimental study on nucleophilic substitution reactions of *meta*- and *para*-substituted benzylamines with benzyl bromide in methanol; the study showed that the reaction rate of the S_N2-type mechanism conformed to the Hammett relation. The nucleophilic substitution of *meta*- and *para*-substituted benzyl bromides with benzylamine should also proceed via a similar S_N2 mechanism. Thus, an experimental study on the nucleophillic substitution of *meta*- and *para*-substituted benzyl bromides with benzylamine was performed to assess the applicability of the Hammett linear free-energy relationship (LFER).

With the advent of the density functional theory (DFT) and advanced software such as *Gaussian*,[17] it is possible to isolate and visually observe the calculated transition state structure of the above S_N2 reaction. Thus, we consider a theoretical study on the reaction in question to gain deep insights into various properties of the calculated transition state structure; such insights cannot be obtained from studies that only employ experimental techniques. Synergistic studies between experiment and theory have gained immense prominence,[18–22] and the present study aptly fits into this genre.

DFT has been used to study many S_N2 reactions.[23–33] For instance, Singh and Goel conducted a mechanistic study on the Menshutkin reaction between 1,4-diazabicyclo[2.2.2]octane and benzylfluoride or fluorodiphenylmethane using DFT calculations at the B3LYP/6-31G(d,p) level of theory.[34] One of their important conclusions was that the reaction between 1,4-diazabicyclo [2.2.2]octane and benzyl fluoride proceeds through a polar S_N2 transition state mechanism, in agreement with earlier literature, whereas the reaction with fluorodiphenylmethane proceeds through a five-membered ring transition state. As this is contrary to the literature, molecular modelling was used by Singh and Goel to understand the Menshutkin reaction mechanism in greater depth.

Pineda et al.[35] studied the hydrolysis of a chlorambucil analogue by DFT. Three S_N1 and one S_N2 reaction mechanisms were proposed. Finally, through theoretical studies, the authors ruled out the S_N2 mechanism and concluded that the most favourable mechanism of hydrolysis occurred through the

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ARTICLE

Effects of Variable Viscosity and Thermal Conductivity on MHD Boundary Layer Flow of Nanofluid with Thermal Radiation

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In this paper, the effects of variable viscosity and thermal conductivity on magnetohydrodynamic boundary layer flow of nanofluid over a stretching sheet in porous medium are investigated. By taking suitable similarity variables, the governing boundary layer equations are transformed into a boundary value problem of coupled nonlinear ordinary differential equations and solved numerically using the weighted residual finite element method. The numerical results for the velocity, temperature and nanoparticle volume concentration together with the skin friction coefficient, Nusselt number and Sherwood number are presented. The effects of various parameters such as Hartmann number H_a, Darcy number Da, thermal Grashof number Gr_1, concentration Grashof number Gr_2, radiation parameter R_d, Prandtl number Pr, viscosity parameter λ, thermal conductivity parameter n, Lewis number Le, Brownian motion parameter Nb and thermophoresis parameter Nt on the flow, heat and nanoparticle volume concentration are illustrated in tabular and graphical forms. A comparison with previously published results on special case of the problem shows excellent agreement.

KEYWORDS:

1. INTRODUCTION

Natural convection flow is frequently encountered in our environment and engineering devices. Free convection flow is caused by the temperature difference and also the flow is affected by the difference in concentration of material constitution. Quite often one can observe that both heat and mass transfer occur simultaneously in free convection. This study of flow phenomena has a wide range of applications in the field of science and technology. Free convective flow past a vertical plate has been studied extensively by Ostrach[1] and many others. The free convective heat transfer on vertical semi-infinite plate was investigated by Berezovsky et al.[2] Martynenko et al.[3] investigated the laminar free convection from a vertical plate. Gebhart and Pera[4] observed the steady state natural convection on a vertical plate with variable surface temperature and variable mass diffusion. Using similarity variables they solved the boundary layer equations. Callahan and Marner[5] solved the problem of transient free convection with mass transfer on an isothermal vertical plate by using an explicit finite difference scheme. Soundalgekar and Ganesan[6] have solved the problem for transient free convection with mass transfer on a vertical plate with constant heat flux by using an implicit finite difference scheme.

The study of magnetohydrodynamics plays an important role in agriculture, engineering and petroleum industries. The problem of free convection under the influence of a magnetic field has attracted the interest of many researchers in view of its applications in geophysics and astrophysics. The problem under consideration has important applications in the study of geophysical formulations; in the explorations and thermal recovery of oil; and in the underground nuclear waste storage sites. Magnetohydrodynamics has its own practical applications too. For instance, it may be used to deal with problems such as cooling of nuclear reactors by liquid sodium and induction flow meter, which depends on the potential difference in the fluid in the direction perpendicular to the motion and to the magnetic field. Soundalgekar et al.[7] analysed the problem of free convection effects on Stokes problem for a vertical plate under the action of transversely applied magnetic field. Sacheti et al.[8] obtained an exact solution for unsteady magnetohydrodynamics free convection flow on an impulsively started vertical plate with constant heat flux. Shanker and Kishan[9] discussed the effect of mass transfer on the MHD flow past an impulsively

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ARTICLE

Peristaltic Transport of a Couple-Stress Fluid with Nanoparticles Having Permeable Walls

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The paper deals with a theoretical investigation of the peristaltic transport of a couple-stress fluid with heat and mass transfer effects. The velocity, pressure drop, time averaged flux, frictional force, mechanical efficiency, temperature profile, nano particle phenomena, heat transfer coefficient and mass transfer coefficient of the fluid are investigated, when the Reynolds number is small and wave length is large by using appropriate analytical methods. Effects of different physical parameters like couple-stress fluid parameters, Brownian motion parameter, thermophoresis parameter, local temperature Grashof number as well as local nano particle Grashof number on pressure drop characteristics, frictional force, heat transfer coefficient, mass transfer coefficient and steam line patterns of the fluid are studied. The expressions for pressure drop, temperature profile, nano particle phenomenon, heat transfer coefficient and mass transfer coefficients are sketched through graphs. The streamlines are drawn to discuss trapping phenomena for some physical quantities.

KEYWORDS: Peristalsis, Couple-Stress Fluid, Brownian Motion Parameter, Thermophoresis Parameter, Heat Transfer Coefficient, Mass Transfer Coefficient.

1. INTRODUCTION

Peristalsis is an important mechanism for fluid transport which can be generated by the propagation of waves along the walls of a flexible tube containing liquid. Physiologically, it is known as an automatic and vital process that drives the urine from kidney to bladder through the ureters, food through the digestive tract, bile from the gall bladder into the duodenum, vasomotion in small blood vessels and so on. The peristaltic transport is also exploited in industrial pumping as it provides efficient means for sanitary fluid transport in nuclear industries and in roller pumps. Several investigations have analyzed the peristaltic motion of both Newtonian and non-Newtonian fluids in physiological as well as mechanical systems.[1–6]

Couple-stress fluid is a special case of non-Newtonian fluid which was developed by Stokes.[7] The important feature of these fluids is that the stress tensor is not symmetric and their accurate flow behaviour cannot be predicted by the classical Newtonian theory. The main effect of couple stresses will to be introducing a size dependent effect that is not present in the classical viscous theories. Shehawey and Mekheimer,[8] studied Couple-stresses in peristaltic transport of fluids. Effect of peripheral layer on peristaltic transport of a couple-stress fluid was investigated by Prasad and Radhakrishnamacharya.[9] Alemayehu and Radhakrishnamacharya,[5] discussed dispersion of a solute in peristaltic motion of a couple-stress fluid through a porous medium with slip condition. Hydromagnetic effect on inclined peristaltic flow of a couple stress fluid was investigated by Shit and Roy.[10]

Nanofluid is a fluid containing nano-sized particles called nanoparticles. These fluids are engineered colloidal suspensions of nanoparticles in a base fluid. The nanoparticles used in nanofluids are typically made of metals, oxides, or carbon nanotubes. Nanofluids have new properties that make them potentially useful in many applications in heat transfer, including microelectronics, fuel cells, pharmaceutical processes and hybrid powered engines.[11] They exhibit enhanced thermal conductivity and the convective heat transfer coefficient compared to the base fluid. Many researchers have done their research in nanofluid technology. A benchmark study on the thermal conductivity of nanofluids was done by Buongiorno et al.[12]

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magnetic moment through cation distribution and magnetocrystalline anisotropy studies in $_xR_xO_4$ (R = Y and Lu; x = 0, 0.05, and 0.075)

Kodam[1], Kamala Bharathi K[2], Raghavendra Reddy V[2], Sudhindra Rayaprol[4], Vasudeva Siruguri[4]

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mag.etic moments through cation distribution and magnetocrystalline anisotropy studies of $_xO_4$ (R = Y and Lu; x = 0, 0.05, and 0.075) compounds were investigated, and the results are discussed sented in this paper. All the compounds were prepared by solid state reaction, and the compounds in the cubic inverse spinel phase with the space group $Fd\bar{3}m$. The cation distribution, bond lengths, u-ter, *etc.* were estimated through the Rietveld refinement of XRD patterns. Increment in the lattice it was observed upon partial substitution of Fe^{3+} by Y^{3+}/Lu^{3+}. The presence of all elements and their ates were confirmed from X-ray photoelectron spectroscopy studies. Analyses of Mössbauer spectra l that the hyperfine fields and the magnetic moments at the B-site (and hence net moment) decreased creasing Y^{3+}/Lu^{3+} occupancy and that the compounds exhibited a Néel-type, collinear ferrimagnetic re. Magnetization measurements revealed that the magnetic moment decreased with Y^{3+}/Lu^{3+} ition. The high field regimes of the magnetization curves were modeled using the law of approach to ration magnetization equation, and the first order cubic anisotropy constants (K_1) were calculated. The ature variation of K_1 and effects of Y^{3+}/Lu^{3+} substitution are explained.

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A new facile and efficient synthesis of 2-((5-aryl-1,3,4-oxadiazol-2-yl) methoxy)-3-methyl quinoxaline and 3-methylquinoxalin-2-yl-2-(5-aryl-2H-tetrazol-2-yl)acetate derivatives

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ABSTRACT

Newly synthesized compounds containing quinoxaline ring fused with tetrazoles and oxadiazoles show array of pharmacological activities, especially, anti-inflammatory, analgesic and anticonvulsant activities. The ability to serve as surrogates or bioisosteres for carboxylic acids, esters and carboxamides made them important moieties in drug designing. Considering the importance of quinoxalines, tetrazoles and 1,3,4-oxadiazoles to both medicinal and heterocyclic chemistry, the following 2-((5-aryl-1,3,4-oxadiazol-2-yl)methoxy)-3-methyl quinoxaline and 3-methylquinoxalin-2-yl-2-(5-aryl-2*H*-tetrazol-2-yl)acetate derivatives are synthesized. The structures of the synthesized compounds were confirmed by ^{1}H NMR, ^{13}C NMR and Mass spectral data. All the synthesized derivatives were tested *in vitro* for their antibacterial activity.

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1. Introduction

Tetrazoles are heterocyclic, five-membered rings containing four nitrogens and one carbon atom (CN_4H_2) [1]. Presence of four nitrogen atoms makes them acidic. They undergo electrophilic as well as nucleophilic substitution [2]. They can act as pharmacophore for the carboxylate group, which increases their utility. Tetrazoles are Angiotensin II blockers as in Losartan and Candesartan [1,3,4]. Tetrazoles and its derivatives show most promising biological activities like antibacterial, antiviral, antifungal, anticonvulsant, anti-cancer, hypoglycemic, antinociceptive and ulcerogenicity index [5-16]. They are cyclooxygenase inhibitors and therefore exhibit analgesic, anti-inflammatory activities [4,17].

It was observed that several highly mutagenic and carcinogenic quinoxalines have been found in heated meat and fried fish. Some of the quinoxaline derivatives have been identified as mild hypo glycaemic agents and used for treating pain, epilepsy and other neurodegenerative disorders. Due to DNA binding properties of quinoxalines, they show highest activity against the herpes virus.

They are part of well-known antibiotics such as levomycin, echinomycin, and actinoleutin that are known to inhibit growth of gram positive bacteria. Quinoxalines show various biological activities such as anti-viral, anti-depressant and as kinase inhibitors. They are active against transplantable tumors.

Fusion of tetrazole with quinoxalinesis considered as planar acidic heterocyclic analogue of carboxylic function, which has the ability to increase potency and enhance bioavailability [18,19].

1,3,4-Oxadiazole is a neutral aromatic molecule which is thermally stable [20]. Quinoxalines containing 1,3,4-oxadiazole have been shown to possess a broad biological activity spectrum including antibacterial, antifungal, antiviral, anti-cancer, antihypertensive, anticonvulsant and anti-diabetic properties [20,21].

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Peristaltic Transport of aCouple-Stress Fluidwith Nanoparticles in an Inclined Tube

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Abstract: *The paper deals with a theoretical investigation of the peristaltic transport of a couple-stress fluid with heat and mass transfer effects. The velocity, pressure drop, time averaged flux, frictional force, mechanical efficiency, temperature profile, nano particle phenomena, heat transfer coefficient and mass transfer coefficient of the fluid are investigated, when the Reynolds number is small and wave length is large by using appropriate analytical methods. Effects of different physical parameters like couple-stress fluid parameters, Brownian motion parameter, thermophoresis parameter, local temperature Grashof number as well as local nano particle Grashof number on pressure drop characteristics, frictional force, heat transfer coefficient, mass transfer coefficient and steam line patterns of the fluid are studied.The expressions for velocity, temperature profile, nano particle phenomenon, heat transfer coefficient and mass transfer coefficients are sketched through graphs. The streamlines are drawn to discuss trapping phenomenon for some physical quantities.*

Keywords: *Peristalsis, Couple-stress fluid, Brownian motion parameter, Thermophoresis parameter, Mechanical Efficiency, Heat transfer coefficient, Mass transfer coefficient.*

1. Introduction

Peristaltic pumping is a word used to describe a progressive wave of contraction along a tube whose cross-sectional area consequently changes. Peristalsis is an inherent property of many tabular organs of the human body. The mechanism of peristaltic transport has been exploited for industrial applications like sanitary fluid transport, blood pumps in the heart lung ma chine, transport of corrosive fluids. In view of its importance, a number of researchers investigated peristaltic transport of Newtonian and non-Newtonian fluids under different conditions (Fung & Yih, (1968), Shapiro et al. (1969), Griffiths, (1989), Srinivasacharya et al. (2003), Prasad, Radhakrishnamacharya, & Murthy, (2010), Ellahi et al. (2014), Prasad et al. (2015)).

Couple-stress fluid model has been widely used by researchers because of its relative mathematical simplicity compared with other models. Blood, lubricants containing small amount of high polymer additives, electro-rheological fluids and synthetic fluids show the effect of couple-stress and rotation of molecules, which are not present in the case of Newtonian fluids. Hence couple-stress fluid serves as a better model for these fluids. Couple-stress fluids was developed by Stokes, (1966). Pal et al. (1988) studied and developed a couple stress model of blood flow in the microcirculation. Effect of peripheral layer on peristaltic transport of a couple-stress fluid was investigated by Prasad & Radhakrishnamacharya, (2009). Maiti & Misra, (2012) studied peristaltic transport of a couple stress fluid: some applications to hemodynamics. Hydromagnetic effect on inclined peristaltic flow of a couple stress fluid was developed by Shit & Roy, (2014).

Nanotechnology has immense contribution in industry since materials of nanometer dimensions exhibit incomparable physical and chemical characteristics. Water, ethylene glycol and oil are common examples of base fluids used for the nanofluid phenomena. Nanofluids have their enormous applications in heat transfer, such as microelectronics, fuel cells, pharmaceutical processes and hybrid powered engines. They explore enhanced thermal conductivity. A large amount of literature is available which deals with the study of nanofluid and its applications. S. U.S. Choi, (1995) was the pioneer to study the nanofluids. Pool boiling of nano-fluids on horizontal narrow tubes was studied by Das et al. (2003). Noreen, (2013) investigated mixed convection peristaltic flow of third order nanofluid with an induced magnetic field. Study of peristaltic motion of nanoparticles of a micropolar fluid with heat and mass transfer effect in an inclined tube was done by Prasad et al. (2015).

It is known that many ducts in physiological system are not horizontal but have some inclination with the axis. Slip effects on peristaltic transport of power-law fluid through an inclined tube was investigated by Naby & Shamy, (2007). Maruthi Prasad & Radhakrishnamacharya, (2008) studied flow of Herschel–Bulkley fluid through an inclined tube of non-uniform cross-section with multiple Stenoses. Shit & Roy, (2014) discussed Hydromagnetic effect on inclined peristaltic flow of a couple -stress fluid. Peristaltic transport of a nanofluid in an inclined tube was investigated by Prasad et al. (2015).

Keeping all the above in view, peristaltic transport of a couple-stress fluid with nanoparticles in an inclined tube has been investigated under the

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Enabling Sustainable Growth of SME'S through Delivery Excellence and Intellectual Property

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Abstract: *India's SME sector comprises of 30 million units employing nearly 60 million people and producing more than 8000 products. With changing global economic scenario, it is very appropriate to focus on growth that is economically, environmentally and socially sustainable. For competing in the global markets, efforts should be engaged in producing goods/services through lean approaches towards better, cheaper and smarter solutions to the customers. SME's need to explore options to invigorate their existing techno functional expertise and protect their firm's intangible assets. In this aspect awareness and understanding of Intellectual property aspects plays vital role primarily due to availability of rich repository which is being enriched with creativity and innovation. Intellectual property being a technological dimension needs to be integrated as a part of business strategy and organization's culture by augmenting the fruits of scientific endeavor, innovation and creativity. For developing countries like India, it is important to strengthen its productive capacity and strive for inclusive, sustainable and equitable economic growth in order to be a global economy player. In this work we present some of the global challenges faced by Indian SME's and propose a framework to leverage on innovation, delivery excellence and intellectual property towards sustainable growth.*

Keywords: *Intellectual property rights, SME, sustainable growth, innovation management.*

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I. Introduction

Globalization provides challenging opportunities towards economic growth. India being a developing country the volatility in the market climate is influencing significantly the growth of SME's. Organizational strategy towards business investments, lean processes and practices to minimize operational cost and deliver quality play an important role and help in sustainable development of the organization keeping socio economic and environmental conditions. SME's being the major contributor to the Indian economy [1-3], it is justifiable to say that, this sector needs to develop a path to excellence in turn making a mark in the global economy. For this it is needless to say that SME's should understand their business in the perspective of internationalization and evaluate their business potential and associated risks as well. Delivery excellence is possible only through sustainability and inclusion which in turn can be achieved through understanding of organizational structure, delivery models connected with operational, pricing, marketing strategies leveraging existing knowledge and resources [4, 5].

In addition to delivery excellence, creativity and innovation drive the knowledge based economies through Intellectual property (IP) assets. The country's policies determine the business strategies and in this aspect IP acts as a tool for wealth creation in a country. These factors also have influence on India to be one of the signatory nations in TRIPS council [6]. But, as the studies indicate [7, 8] there is a lacuna in the SME's understanding and awareness regarding intellectual property rights. This is especially true for SME's present in the rural sector. For a developing country like India, that is rich in traditional, folklore, agricultural, traditional medication like Ayurveda, homeopathy, unani etc, there is a great need to develop a strategic, sustainable generic framework that is suitable for various sectors to adapt and evaluate their knowledge in the perspective of intellectual property. This is need of the hour to sustain in the global market as well as to generate wealth. Due to the rapid proliferation of the technology in this digital age, it is crucial that the SME sector brings its intangible mode of knowledge to the tangible mode through IP that acts as a catalyst in the progress of the nation economically.

In this present work, we try to give a generic frame work that might be adapted with modifications suitable to their business in general by the SME's present in the technical sector. Our basic motive in this work is to highlight integration of the delivery excellence that is crucial for business with Intellectual property to enhance/create knowledge assets for itself and in turn for the country.

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Area-Delay-Power Efficient Booth Encoded Reversible Multiplier Using Compressors

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Abstract

Reversible logic gates became very important and promising technology having more applications in low power CMOS design, Quantum computing, Optical computing and Nano Technology. The basic set of gates like AND, OR, XOR are not reversible. A se reversible gates has been introduced by various researchers. Few basic reversible gates are Feynman, Toffoli, TSG, Fredkin, Per etc. Theoretically it has been proved that energy dissipation would not occur if a computation is carried out in a reversible way. Th paper proposes a Novel reversible Radix 4 Booth Encoded Wallace Tree multiplier using 4:2 compressors, 5:2 compressors.

Keywords

Reversible gates, Compressors, Low power, Booth Encoder.

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Computational Cost Reduction for *N*+2 Order Coupling Matrix Synthesis Based on Desnanot-Jacobi Identity

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ABSTRACT Matrix inversion is routinely performed in computational engineering, with coupling matrix filter synthesis considered here as just one of many example applications. When calculating the elements of the inverse of a matrix, the determinants of the submatrices are evaluated. The recent mathematical proof of the Desnanot–Jacobi (also known as the "Lewis Carol") identity shows how the determinant of an *N*+2 order square matrix can be directly computed from the determinants of the *N*+1 order principal submatrices and *N* order core submatrix. For the first time, this identity is applied directly to an electrical engineering problem, simplifying *N*+2 order coupled matrix filter synthesis (general case, which includes lossy and asymmetrical filters). With the general two-port network theory, we prove the simplification using the Desnanot–Jacobi identity and show that the *N*+2 coupling matrix can be directly extracted from the zeros of the admittance parameters (given by *N*+1 order determinants) and poles of the impedance parameters (given by the *N* order core matrix determinant). The results show that it is possible to decrease the computational complexity (by eliminating redundancy), reduce the associated cost function (by using less iterations), and under certain circumstances obtain different equivalent solutions. Nevertheless, the method also proves its practical usefulness under constrained optimizations when the user desires specific coupling matrix topologies and constrained coefficient values (e.g, purely real/imaginary/positive/negative). This can lead to a direct coupling matrix constrained configuration where other similar methods fail (using the same optimization algorithms).

INDEX TERMS Coupling matrix, determinant, filter synthesis.

I. INTRODUCTION

In computational engineering, matrix inversion is routinely performed and this requires the calculation of its determinant. While generally considered a mature subject, there is still scope for new algorithms [1] and methods [2], which is critical for simplifying computational effort and ultimately speeding up simulation time.

For an *N* order filter, *N* order coupling matrix filter synthesis requires *N* order matrix inversion [3], [4]. The *N*+2 coupling matrix, on the other hand, includes an extra pair of rows (top and bottom) and extra pair of columns (to the left and right) surrounding the *N* order core submatrix, to describe all the couplings between the source and load and the different nodes of the circuit [5], [6]. The *N*+2 order coupling matrix synthesis can start from the transversal coupling matrix for the lossless case [6] and lossy case [7], which can be obtained directly from the poles and residues of the short-circuit admittance or *Y*-parameters. Since transversal coupling is not practical for physical implementations, the authors of [6], [7] search for a new coupling matrix that shares the same target frequency response. Classical synthesis/reconfiguration techniques employ similarity transformations; based on either rotations [6], [8] or reflections [9] for reciprocal lossless filters (having symmetrical real coupling matrices), hyperbolic rotations [10], [11] or hyperbolic reflections [12] for reciprocal lossy filters (having symmetrical complex coupling matrices). These transformations are reapplied until the coupling matrix is transformed into the desired filter topology. The drawbacks with these methodologies is that

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Statistical Modelling of GNSS Multipath Error Using Triple-Frequency Linear Combination

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Abstract

Multipath is considered as the major debilitating factor affecting the accuracy of global navigation satellite system (GNSS) and can lead to position error of 10 meters. Therefore, multipath characterization and modelling is indispensable. Now multipath error can be precisely estimated using triple frequency linear combination of GNSS signals. In this paper the triple frequency linear combination of code measurements of GPS (L1/L2C/L5) and Galileo (E1/E5a/E5b) signals are considered to precisely estimate the multipath and statistical model the error distribution. For multipath free environment the data with residual multipath error, does not follow any distribution.

1. Introduction

The shadowing of the signal from obstructions, foliage etc., and signal reflections due to terrain, buildings, vehicles etc., cause multipath error. The combination of multipath and shadowing is more detrimental in the context of multi-GNSS positioning. Multipath is considered as systematic as well as random error depending upon the type of application. The calibration of multipath remained as unsolved problem even after efforts by many investigators. Multipath introduces errors in both code phase and carrier phase measurements and subsequently in Position, Velocity and Time estimation. To reduce multipath effects various counter measures are deployed. These approaches include hardware (Multipath Estimating Delay Lock Loop (MEDLL) technique, Multiple Signal Classification (MUSIC) technique with multiple antennas etc.,), software (filtering techniques like RLS, MLS etc.,) and hybrid (combination of both hardware and software) [1]. Altogether, these methods have their own advantages and limitations and can be found in open literature [2]. The new receivers today available in market are capable of Tracking signals of multi-GNSS systems. Therefore, the receiver should be capable of processing the multi-frequency signals of these systems in complex environment, while adopting suitable models for various errors of GNSS link-budget. Further, in the development of software-based receiver and simulators for GNSS applications, the algorithms for multipath characterization for various environments will improve the commercial value of the receivers for various applications. Therefore, deep understanding of multipath characteristics is essential.

In the present study the linear combination of code measurements of GPS and Galileo signals are considered to precisely estimate the multipath at the station (GCET). As triple frequency approach found to be promising for precise estimation of multipath at a location, the three frequencies signals of GPS (L1/L2/L5) and Galileo (E1/E2/E5) are used. The following distributions namely Weibull, Gamma, Normal Beta and uniform ones are tested with the experimental data.

2. Multipath estimation: triple frequency linear combination

Direct and indirect signals received at the Global Positioning System (GPS) receiver have relative phase offsets and the phase differences, which are proportional to the differences of the path lengths. Multipath error can be estimated by using linear combinations of code and carrier phase measurements. The code phase and carrier phase multipath using triple frequency GPS measurements is given as [3],

$$M_{P_{125}} = \lambda_5^2(P1-P2)+\lambda_2^2(P5-P1)+\lambda_1^2(P2-P5) \quad (1)$$

$$M_{\phi_{125}} = \lambda_5^2(\phi 1-\phi 2)+\lambda_2^2(\phi 5-\phi 1)+\lambda_1^2(\phi 2-\phi 5) \quad (2)$$

Eq.(1) and (2), shows triple frequency linear model for multipath estimation from code and carier phase observations pertaining to three frequency signals respectively. The indexing of 1, 2, 5 in above equations corresponds to three frequencies, in case of GPS (U.S.A) L1 (1575.42 MHz), L2 (1227.60 MHz) and L5 (1176.54 MHz), for Galileo (Europe) E1 (1575.42 MHz), E5a (1176.45 MHz) and E5b (1207.14 MHz). $\lambda 1,2,5$ denotes wavelengths. This linear combination completely removes ionospheric error and other measurement errors as well and gives absolute estimate of multipath.

3. Distributions and statistical modelling

To characterize the behavior of a random variable PDFs can be used. Multipath effect is also random and thus can be described by using PDFs. In order to understand which

ScienceDirect

Applied Materials Today
Volume 27, June 2022, 101435

Thermo-photodynamic perspective of the simultaneous S-Scheme ternary heterostructure through Ag_3VO_4 shuttle for the increased photo-redox ability

Aneek Kuila [a], Santosh Routu [b], Pichiah Saravanan [a] ✉, Chuanyi Wang [c], Detlef Bahnemann [d, e]

Show more

Outline | Share | Cite

https://doi.org/10.1016/j.apmt.2022.101435

Highlights

- A hierarchical directional heterojunction among $InVO_4$-Ag_3VO_4-gC_3N_4 was synthesised.
- DFT calculation revealed the agnostic interaction where Ag_3VO_4 acted as a bonding bridge and charge-transfer mediator.
- Induced redox ability of the constituents increased the thermo-photocatalytic property.
- A simultaneous S-scheme charge transfer is observed during the exciton transfer.

Abstract

A binary heterostructure bearing Ag_3VO_4 and $InVO_4$ is deposited over a 2D gC_3N_4 nano-bed through a multistep hydrothermal technique. Though the synthesis is non-directional, the formation of the junction is governed through Ag_3VO_4 acting as a shuttle for charge transfer between $InVO_4$ and gC_3N_4. Vacant d-orbital in the Ag_3VO_4 accommodated the incoming ⊡ electrons from gC_3N_4 forming a covalent bond through Agostic interactions and was as

GCET/318/2017-18, Dt. 19/04/2018

Email : erip_er@hqr.drdo.in
Tele : 011- 23017661
Fax : 011- 23017582

No. ERIP/ER/1504754/M/01/1719
Directorate of Extramural Research & Intellectual Property Rights (ER&IPR)
Defence Res & Dev Orgn (DRDO)
DRDO Bhawan, Rajaji Marg
New Delhi-110 011

Dated: 2 Apr 2018

To

Prof. S. Ramana Murthy
Professor
Department of Electronics and Communication Engg.
Geethanjali College of Engineering and Technology
Cheeryal (V), Keesara (M), RR District- 501 301
Telangana

To
Prof S Ramana Murthy Garu
19/04

Sub: Grants-in-Aid for research project titled **"Development of Novel Carbon Nanotube/Polymer Nanocomposite Materials for EMI Applications".**

Approval of the competent authority DG (TM) is hereby conveyed for a grant of **Rs. 45.81 Lakh** (Rupees Forty Five Lakh and Eighty One Thousand Only), to Geethanjali College of Engineering and Technology, Telangana, for pursuing the research on the subject titled project by Prof. S. Ramana Murthy, Professor, Department of Electronics and Communication Engg., Geethanjali College of Engineering and Technology, Cheeryal (V), Keesara (M), RR District- 501 301, Telangana, as Principal Investigator and Shri E. Rangacharulu of the same Institute as Co-Investigator.

2. The grant shall be spent as follows:

Expenditure on ↓ (Rs in lakh) during →	Year 1	Year 2	Year 3	Line Total
a) Staff : 01 JRF @ Rs. 25000/- pm + HRA @ 30%	3.90	3.90	3.90	**11.70**
b) Equipment (including spares thereof) Anex 'A'	22.52	-	-	**22.52**
c) Operation and maintenance	-	-	-	**-**
d) Expendables	2.00	2.50	2.50	**7.00**
e) Travel (Domestic)	0.50	0.50	0.50	**1.50**
f) Contingencies	0.40	0.40	0.25	**1.05**
g) Visiting faculty or Research Consultant	0.29	0.29	0.29	**0.87**
h) Procured services (other than (g)) and metered utilities	-	-	-	
i) Institutional Overheads Charge @ 10% of (a)	0.78	0.39	-	**1.17**
Column Totals	**30.39**	**7.98**	**7.44**	**45.81**

Grand total: Rs. 45.81 Lakh (Rupees Forty Five Lakh and Eighty One Thousand Only).

3) The project will last for **03 years** from the **date of release of the first installment by the PCDA (R&D)** and it will be governed by the terms and conditions given overleaf.

4) The deliverables of the project are:-

- **An EMI shielding effectiveness (SE) upto 30 dB at the band range of 8.2-12.4 will be obtained for composites with 15%-20wt% SWCNT loading.**
- **Single layer absorbers with different thickness will be designed, fabricated and tested for EM absorbing properties.**

5) This sanction issues in exercise of powers conferred to Sl. No. 3.1 of GOI Ministry of Defence letter No. DRDO/DBFA/FA/83226/M/01/2031/D (R&D) dated 30th July 2010.

6) The release of funds will be authorized by Accounts Officer of the Directorate of ER&IPR.

7) The expenditure is debitable to Major Head 2080 - Defence Services – Research & Development, Minor Head 004 – Research/Research & Development, Sub-Head (C)- Extramural Research (EMR) Code Head 852/06.

8) This is issued with the concurrence of IFA(R&D) New Delhi vide their U.O. No. 1183/1557 Dated: 05.03.2018.

9) The sanction code of ER&IPR is DG/TM/ERIPR/GIA/18-19/0408/001.

10) Separate savings bank account to be maintained for the project.

11) Interest accrued to be refunded to DRDO through Demand Draft in favour of CDA (R&D), New Delhi.

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301

(Sh. Anil Kumar Aggarwal)
Director

No. SR/FTP/ES-156/2014

SCIENCE & ENGINEERING RESEARCH BOARD (SERB)

(A Statutory Body of the Department of Science & Technology, Government of India)

5&5A, Lower Ground Floor,
Vasant Square Mall, Sector-B,
Pocket-5, Vasant Kunj,
New Delhi – 110070.

Dated: 23.10.2017

ORDER

Subject: Financial assistance for the Research Project entitled ***"Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath"***.

PI: Dr. V. Satya Srinivas, Associate Professor, Electronics and Communication Engineering, Geethanjali College of Engineering and Technology, Cheeryal (V) Keesara (M), R. R. District, Telangana-501503, Hyderabad.

In continuation to the sanction order of even number dated 04.09.2015, Sanction of the SERB is accorded to the payment of **Rs. 2,50,000/- Only (Rupees Two Lakh Fifty Thousand Only)** under the recurring grant head to the ***Principal, Geethanjali College of Engineering and Technology, Hyderabad*** being the grant for the year 2017-18 for implementation of the said research project.

2. Sanction of the SERB is also accorded to the carry forward of the unspent balance of **Rs. 8,74,696/- (Rs. 7,51,140/- under non-recurring head and Rs. 1,23,556/- under recurring head)** under recurring head from the year 2015-16 to the current financial year 2016-17 (ex-post facto) for the same purpose for which it was sanctioned.

3. Sanction of the SERB is also accorded to the carry forward of the unspent balance of **Rs. 97,689/- under recurring head** from the year 2016-17 to the current financial year 2017-18 for the same purpose for which it was sanctioned.

4. The expenditure involved is debitable to

Fund for Science & Engineering Research (FSER)

This release is being made under **YSS- Earth and Atmospheric Sciences.**

5. The Sanction has been issued with the approval of the competent authority under delegated powers and vide Diary No. SERB/F/**6971**/2017-18 dated **20.10.2017.**

6. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website (www.serb.gov.in).

7. The total release amount of **Rs. 2,50,000/- (Rupees Two Lakh Fifty Thousand Only)** will be drawn by the Under Secretary of the SERB and will be disbursed to the ***"Principal, Geethanjali College of Engineering and Technology, Hyderabad"*** by means of RTGS transaction as per their Bank details given below:

Name of the Institute	Geethanjali College of Engineering and Technology (SERB)
Account Number	0606101558960
Bank Name, Branch	Canara Bank, Hyderabad ABID Road, Hyderabad, Telangana-500001
IFSC Code	CNRB0000606
PI's Email Address	sathyavemuri@gmail.com
Dr. Prahlad Ram, Scientist C	prahlad@serb.gov.in

Contd...-2-

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Gmail Dr. V S Srinivas GCET - SC0881 <sathyavemuri@gmail.com>

RTGS/NEFT UTR/ TRANS No. – File No.- SR/FTP/ES-156/2014

Finance Wing, SERB <finance@serb.gov.in> 9 February 2018 at 10:
To: sathyavemuri@gmail.com, info@gcet.edu.in
Cc: "DR. PRAHLAD RAM,SCIENTIST-'C'" <prahlad@serb.gov.in>

Madam/Sir,

The below details are for **Science & Engineering Research Board (SERB)**Sanction Order (*attached to this mail*).

Sanction Order No	-	SR/FTP/ES-156/2014
Sanction Date	-	23-10-2017
PI Name	-	V SATYA SRINIVAS
Institute/University	-	GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
City Name	-	VALDLAMUDI
Account Number	-	0606101558960
Bank Name	-	Canara Bank
Branch Name	-	HYDERABAD ABID ROAD
Amount	-	250000
UTR No	-	UBINH18038229880 / SAA331151845
Transaction Date	-	07-02-2018

SERB Reference Number:

Bill No	-	GIA/7527
Diary No/Finance No	-	SERB/F/ 6971 /2017-2018

Confirmation of receipt of funds may be sent by email only.

IMPORTANT:

1. **SEPARATE Utilization Certificates (UCs)** for **Recurring and Non-Recurring Grants (even if *DISBURSED BY SERB THROUGH ONE SANCTION ORDER* for your project) should be sent directly** to the grant Sanctioning Authority by name *(signatory of the sanction order)***within twelve months of the closure of the financial year in which the grants were released irrespective of whether the subsequent instalment of grant is due for release or not.**

2. However, if any unspent balance is to be **refunded**, kindly ensure that the unutilized amount may be refunded immediately by way of an **a/c payee cheque/DD** drawn in favour of **"Fund for Science & Engineering Research", payable at New Delhi** and **forwarded to the undersigned at the address given below:**

Under Secretary
SCIENCE & ENGINEERING RESEARCH BOARD (SERB)
(Established through an Act of Parliament: SERB ACT 2008
Department of Science & Technology, Government of India)
5&5A LGF,
Vasant Square Mall,
Vasant Kunj, New Delhi 110 070
INDIA
+91-9818223293-94
+91-11-40000328, 352, 319, 349
+91-11-40000329 Telefax

SERB: Making Good Ideas Work . . .

6971.pdf
134K

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Annexure-III

UTILISATION CERTIFICATE

[FOR THE FINANCIAL YEAR - 2017-18 (1st April 2017 to 31st MARCH 2018)]

(Recurring head)

1. Title of the Project/ Scheme: "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" under start up grant for young scientist scheme.

2. Name of the Institution: Geethanjali College of Engineering and Technology (GCET)

3. Name of the Principal Investigator: Dr. V. Satya Srinivas

4. Science & Engineering Research Board (SERB)
Sanction order No & date sanctioning the project: SR/FTP/ES-156/2014, dt: 4th Sept. 2015
(First financial sanction order)

5. Head of account as given in the original sanction order: B. Recurring Items (General):
   1. General A (Consumables, Contingencies, Travel-domestic).
   2. General B (Overhead Charges).

6. Amount brought forward from the previous Financial year quoting SERB letter no and date in which the authority to carry forward the said amount was given : i. Amount: **Rs.97,689/-**
ii. Letter No.: SR/FTP/ES-156/2014
iii. Date: 4th Sept. 2015

7. Amount received during the financial year (Please give SERB Sanction order no and date) : i. Amount: **Rs.2,50,000/-**
ii. Order No: SR/FTP/ES-156/2014
iii. Date: 23.10.2017

8. Interest earned : **Rs.1,216/-**

9. Total amount that was available for expenditure (excluding commitments) during the financial year (Sr. No. 6+7+8) : **Rs.3,48,905/-**

9. Actual Expenditure (excluding commitments) Incurred during the financial year (upto 31st March) : **Rs.3,20,172/-**

10. Balance amount available at the end of the financial year: **Rs.28,733/-**

11. Unspent balance refunded, if any (please give details of cheque no etc.): -Nil-

12. Amount to be carried forward to the next financial year (if applicable): **Rs.28,733/-**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

UTILISATION CERTIFICATE
(Recurring head)

Certified that out of **Rs.2,50,000/- (Rupees Two Lakhs Fifty Thousand)** of grants-in-aid sanctioned during the year **2017-18** in favour of Geethanjali College of Engg. & Tech., vide SERB order No. SR/FTP/ES-156/2014, dated: 23rd October 2017 and Rs.**97,689/- (Rupees Ninety Seven Thousand Six Hundred and Eighty Nine)** on account of unspent balance of the previous year, **Rs.1,216/-** (Rupees One Thousand Two Hundred and Sixteen) earned as interest during FY.2017-18, and out of total available balance of **Rs.3,48,905/- (Rupees Three Lakhs Forty Eight Thousand Nine Hundred and Five),** a sum of **Rs.3,20,172/- (Rupees Three Lakhs Twenty Thousand One Hundred and Seventy Two)** has been utilised for the purpose of execution of the project entitled "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" for which it was sanctioned and that the balance of **Rs.28,733/- (Twenty Eight Thousand Seven Hundred and Thirty Three)** remaining unutilised at the end of the year will be adjusted towards the grants-in-aid payable during the next year i.e. 2018-19.

(Dr. V. Satya Srinivas)	(Dr. S.Udaya Kumar)	(B.Mallesham)	Auditor
Signature of PI	Signature of Head of the Institute	Accounts Officer of the Institute	For HARI BABU & ASSOCIATES CHARTERED ACCOUNTANTS Firm Regn. No. 001064S
Date: 26/4/2018	Date:	Date: 26/4/2018	Date:

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(Ch. HARI BABU) Partner
M. No. 022301

(Countersigned in SERB)
Signature:
Designation:
Date:

HARI BABU & ASSOCIATES
Chartered Accountants
Plot No. 10, Flat No: 201 AR. Residency,
Ravi Co-op Housing Society
Trimulgherry, Secunderabad - 500 015.
PH: 040 - 27741549

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

UTILISATION CERTIFICATE
(Recurring head)

Certified that out of **Rs.1,50,000/- (Rupees One Lakh Fifty Thousand)** of grants-in-aid sanctioned during the year **2018-19** in favour of Geethanjali College of Engg. & Tech., vide SERB order No. SR/FTP/ES-156/2014, dated: **27th September 2018** and **Rs.28,733/-** (**Rupees Twenty Eight Thousand Seven Hundred and Thirty Three**) on account of unspent balance of the previous year, **Rs.3,559/-** (**Rupees Five Hundred and Fifty Nine**) earned as interest during FY.2018-19, and out of total available balance of **Rs. 1,82,292/-** (**Rupees One Lakh Eighty Two Thousand Two Hundred and Ninety Two**), a sum of **Rs.1,83,051/-** (**Rupees One Lakh Eighty Three Thousand Fifty One**) has been utilised for the purpose of execution of the project entitled "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" for which it was sanctioned and that the balance of **Rs.-Nil-** (remaining unutilized at the end of the year will be adjusted towards the grants-in-aid payable during the next year i.e. 2019-20.

(Dr. V. Satya Srinivas) Signature of PI Date: 29/4/2019	(Dr. S.Udaya Kumar) Signature of Head of the Institute Date: 23/4/19	(B.Mallesham) Accounts Officer of the Institute Date:	Auditor Date: 30/4/19 UDIN No :- 19022361AAAAAD2782

Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(Countersigned in SERB)
Signature:
Designation:
Date:

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Phone : 9533791618
Fax : +91-40-24220320
Website : www.geethanjaliinstitutions.com
info@gcet.edu.in

Geethanjali

Geethanjali College of Engineering and Technology

AUTONOMOUS

(Accredited by NBA, Approved by AICTE, New Delhi)

Sy.No. 33 & 34, Cheeryal (V), Keesara (M), Medchal District. - 501 301.

No.GCET/ECE/R&D/SERB/2017 Date:6th September 2017

To
Dr. Umesh Kumar Sharma
Scientist-E
Earth and Atmospheric Sciences,
Science and Engineering Research Board (SERB),
5&5A, Lower Ground floor,
Vasant Square Mall, Sector-B, Pocket-5,
Vasant Kunj, New Delhi - 110070

Sub:- Request for release of 2nd installment of grant-Reg.
Ref1: DST Sanction Order No: SR/FTP/ES-156/2014, dt: 4th September 2015
Ref2: GCET/ECE/R&D/SERB/2017, dt:20th May 2017

Dear Sir,

With reference to the subject cited above, I enclosed herewith revised/corrected utilization certificate (Recurring Head) for your kind perusal. I request you to kindly release the second installment of grant. Kindly do the needful.

Thanking you,

Yours Sincerely,

Dr. V. Satya Srinivas
(Principal Investigator)

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Statement of Expenditure

(Period: 1st April 2017 to 31st March 2018)

Sr. No.	Sanctioned Heads	Total Funds Allocated (indicate sanctioned or revised)	Expenditure Incurred			Total Expenditure till 31st March 2018	Balance as on (31st March 2017)	Requirement of Funds upto 31st March 2018	Remarks (if any)
			1st Year (23rd Sep. 2015 to 31st March 2016)	2nd Year (1st April 2016 to 31st March 2017)	3rd Year (1st April 2017 to 31st March 2018)				
(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)		
1.	**Non-recurring (Capital Items)** Equipments [GNSS Receiver, Work Station and Printer]	**Rs.15,00,000/-**	Rs.7,48,860/-	Rs.7,48,859/-	-NA-	Rs.14,97,719/-	**-Nil-***	-Nil-	* Balance amount (Rs.2,281/-) return to SEB DST
2.	**Recurring Items (General)** General-A: (Consumables, Contingencies & Travel-domestic)	**Rs.3,50,000/-**	Rs.40,679/-	Rs.36,962/-	Rs.78,672/-	Rs.1,56,313/-	**Rs.1,93,687/-**	**Rs.1,93,687/-**	-Nil-
	General-B: (Overhead Charges)	**Rs.3,00,000/-**	Rs.58,500/-	-Nil-	Rs.2,41,500/-	3,00,000/-	**-Nil-**	-Nil-	-Nil-
3	**Total**	**Rs.21,50,000/-**	**Rs.8,48,039/-**	**Rs.7,85,821/-**	**Rs.3,20,172/-**	**Rs.19,54,032/-**	**Rs.1,93,687/-**	**Rs.1,93,687/-**	**-Nil-**

*** Balance amount of Rs.2,281/- under head non-recurring has been returned to SERB DST (Canara Bank DD no.071504, dt:12/12/2017)**

Geethanjali College of Engg. and Tech. Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(Dr. V. Satya Srinivas)
Signature of PI
Date: 26/4/2018

(Dr. S.Udaya Kumar)
Signature of Head of the Institute (with seal)
Date: 26/4/2018
PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(B.Mallesham)
Accounts Officer of the Institute
Date: 26/4/2018
GEETHANJALI COLLEGE OF ENGG. & TECH. Accounts Section

Auditor
Date:
For HARI BABU & ASSOCIATES
CHARTERED ACCOUNTANTS
Firm Regn. No. 001064S
(Ch. HARI BABU) Partner
M. No. 022301

Contract for Acquisition of Research Services (CARS)

Signature of Authority identified at (11) below, DRDO hereby contract on the Profession Service Provider identified at (3), the provision of Professional Services described at (6, within the time stated at (8), for payments at (9.2), and subject to other conditions overleaf.

AMENDMENT - I

1. Title or DRDO's Research Service Qualitative Requirements (RSQR) **"Design of solenoid magnet system for Backward Wave Oscillator"**				2. CARS No. MTRDC/MMG/17111/LPO/134/18-19/BUP Dt.29.11.18		
3. R. S. Q. R. Document Ref. No. Nil, Dt. Nil	4. Date of issue			5. Issuing DRDO Lab/Estt./Project	6. CARS No.	7. Date of CARS
	Year	Months	Date	MTRDC, DRDO, Bangalore	MTRDC/MMG/ 17111/LPO/134 /18-19/BUP	29.11.2018
	2018	11	29			
8. Name and Address of RSP in CARS Name : Dr. R. S. Raju Designation: Professor Deptt. ECE and Dean, R&D, Geethanjali College of Engineering and Technology (GCET), Hyderabad						

This contract will be required a formal amendment if the following key professional are not available to RSP: **Prof. R. S. Raju**

RSP is authorized to substitute/change/add key professionals/research consultants as follows:

Principal technical features of Research Service to be provided by RSP (Annexure - A)

DRDO will make available the following DRDO owned equipment to RSP : NA

9. The Technical performance of this contract shall be completed when RSP submit the final report before (date) : 15 Months

9.1	Estimated expenditure	Rs. in lakhs	
		Amount	Total Rs.
a)	Personal Junior Research Fellow (JRF)/Project Assistant for one year	3.72	3.72
b)	Equipment#	1.90	1.90
c)	Others: 1. Expendables (consumables)	0.40	0.40
	2. Travel + Conference :	0.6	0.6
	3. Contingency :	0.4	0.4
	Total	7.02	7.02
	Overhead 15%	1.053	1.053
	Grand Total	-	**8.073**

Payment will be made within 45 days of receipt by L/E/P of contingency Bill

10. General conditions of CARS remain unchanged. Other specific conditions in CARS amended to read

11. RSP's Signatory to original contract:

Name : Dr Udaya Kumar Susarla
Designation: Principal
Date : January 29, 2020

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

12. Signature of L/E/P contract administrator:

10/2/2020

Name: डॉ. एस उमामहेश्वर रेड्डी
Designation: Dr. S Umamaheswara Reddy
Date: निदेशक / Director
सूक्ष्मतरंग नलिका अनुसंधान तथा विकास केन्द्र
Microwave Tube R&D Centre
डी.आर.डी.ओ., रक्षा मंत्रालय
DRDO, Ministry of Defence
जालहल्ली, बेंगलूरु/Jalahalli, Bengaluru – 13

Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

50

TEJA EDUCATIONAL SOCIETY(GCET)

Sub-Ledger Bio Electrical & Energy Systems Fee 01-04-2017 To 31-03-2018

Date Number	Voucher R.no	Cheq. No Amount	Account	Debit	Credit	Narration
Bioelectrical						
17-02-18	Jrn:884		R &D Project Exp (DST & SERB)		300,000.00	Towards Paid for R&D Project Breif Review Exp
17-02-18	Pmt:3705	611326	CANARA BANK-(OD-A/c.No:55580-TEJA)	150,000.00		Towards Paid for R&D Dept Project Expenses by college
			Total (Rupee	**150000**	**300000**	

TEJA EDUCATIONAL SOCIETY(GCET)

Sub-Ledger Bio Electrical & Energy Systems Fee 01-04-2018 To 31-03-2019

Date Number	Voucher R.no	Cheq. No Amount	Account	Debit	Credit	Narration
13-06-18	Jrn:135		TDS Payable	6,000.00		Towards TDS Deduct 2% (300000*2%)
13-06-18	Pmt:847	269311	SBH Bank -a/c(PGCET-62079625817)	144,000.00		Towards Paid for R& D Project Work Order balance amt-ALQPL1356F
26-02-19	Jrn:1116		R &D Project Exp (DST & SERB)		100,000.00	TOwards Invoice No:GCET-003
08-03-19	Jrn:1074		TDS Payable	2,000.00		Towards TDS Deduct 2% (100000*2%)
08-03-19	Pmt:4302	829058	SBH Bank -a/c(PGCET-62079625817)	98,000.00		Towards Paid for Adv Payment
			Total (Rupee	**250,000.00**	**100,000.00**	

TEJA EDUCATIONAL SOCIETY(GCET)

Sub-Ledger Bio Electrical & Energy Systems Fee 01-04-2019 To 31-03-2020

Date Number	Voucher R.no	Cheq. No Amount	Account	Debit	Credit	Narration
09-08-19	Jrn:282		TDS Payable	4,000.00		TOwards TDS Deducvt 2% (200000*2%)
09-08-19	Pmt:1560	141195	CANARA BANK-(OD-A/c.No:55580-TEJA)	196,000.00		Towards Paid for R& D Project Purpose Adv Payment
16-09-19	Jrn:389		R &D Project Expenses		200,000.00	Towards Paid Invoice No:GCET-004
28-10-19	Jrn:509		TDS Payable	1,960.00		Towards TDS Deduct 2% (98000*2%)
28-10-19	Pmt:2436	756725	SBI Bank -a/c(PGCET-62079625817)	96,040.00		Towards Paid for R& D Project Purpose Balance Payment
27-12-19	Jrn:735		R &D Project Expenses		98,000.00	Towards Invoice No:GCET-004 Bill Date:19/08/19
			Total (Rupee	**298,000.00**	**298,000.00**	

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AN IMPROVED DOARP ROUTING PROTOCOL FOR MOBILE AD HOC NETWORKS

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Abstract:

In lightweight hierarchical routing model, Way Point Routing Protocol (WPRP) nodes taken as the number of intermediate nodes for routing the waypoints and the route is separated into segments by the waypoints. Waypoints, including the source and the destination, run a high-level intersegment routing protocol (DSRP), while the nodes on each segment run a low-level intra segment routing protocol (AODVRP). One discrete advantage of proposed model depends on the mobility of a node in the route may out or fails, so instead of removal the whole actual route and discovering a novel route from the source to the destination, only the two waypoint nodes of the broken section have to find a new segment. In contrast, the ZRP and CGSR maintain hierarchies for existing hierarchical routing protocols for the complete network. We maintain initialization intended for WPRP to use DSRP and AODV. Hence it can view as DSRP over AODVRP that is DOARP routing protocol. The MANNET's are the set of radio enabled nodes in which it communicates with each other through broadcasting. There is a lack of infrastructure to organize and communicate to NWS because the dynamic configurations of MANETs, finds a recite from a source to a destination when might be very difficult. Most of the modern routing protocols works best based on or demand fashion. It includes the Ad hoc On-demand Distance Vector protocol (AODV) and dynamic Source Routing protocols (DSRP) are the two re-knowed on demand routing protocols for MANETs. It is combined into single hierarchical routing protocol and become two special cases of the proposed protocol. Again, one of the methodologies for DOARP is a multi destination route discovery. By using NS-3 tool these protocols were simulated and compared in terms of average control packets, average routing length, average packet delivery ratio and end to end delay.

Keywords: Routing Protocol; MANETs; NS-3.

1. Introduction

Ad-hoc networks have the ability to maintain networks at anytime, everywhere. MANETs typically a collection of moving nodes which forms a dynamic network temporarily without using existing centralized administration or already available network infrastructure. At this age of research focuses on mobile Ad-hoc networks. The routing protocol does a major role in two hosts or two senders or receivers which we want to send packets, thought it may not able to exchange messages directly. In Ad-hoc networks all the mobile nodes are to be connected dynamically in a random fashion. But all these mobile node of these networks acts as routers and be in a group to identify and maintain the routes for the other ad-hoc nodes in the mobile network. These scenarios become more complex if more mobile nodes are accelerated in the network. The ad-hoc nodes must be routed according to certain protocol and select the best route between the mobile nodes in order to optimize the bandwidth overhead and to enable for providing proper routing, so that it minimize the time required to converge after the topology changes.[1]

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DETERMINATION OF RESOURCE USAGE CHARACTERISTICS FOR HADOOP MAP REDUCE TASKS

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ABSTRACT:

Hadoop is a common frame work used to process large amounts of data. It uses map reduce framework to divide the data and process it parallel on multiple nodes. Different jobs have different resource usages of CPU and IO and similarly different nodes have different loads. If resource usage of jobs and resource availability of nodes are considered in the decision of scheduling of multiple map and reduce tasks of different jobs, an optimized execution time can be obtained. It is more useful in could environment as map/reduce tasks execute on virtual machines in spite of physical machines. As parts of research conducted to build a dynamic scheduler for map reduce applications considering job and VM characteristics, this paper proposes a technique to study the job characteristic in terms of CPU and IO of usage.

Keywords: Hadoop, Big data, map reduce scheduler, Resource Manager

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Experimental analysis of image encryption using elgamal and block-substitution method for color images

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Abstract

This paper presents an encryption technique for color images. In this method byte code is extracted from the color image which is converted into binary data. Cipher text is generated by applying Block substitution encryption method on the obtained binary data. The effectiveness of the proposed method has been estimated by computing chi-square value. Obtained results show that the encryption method is suitable for both symmetric and asymmetric images of larger size.

Keywords: *Image encryption, Block cipher, Byte code, Block substitution.*

1. Introduction

The rapid growth of digital and multimedia data is developed and transmitted through the networks in science and technology,

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Research paper

Temperature Field and Residual Stress of Butt Welding for IN182 Plate

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stract

e welding process is a nonlinear phenomenon in nature which leads to deformation and residual stresses in weldments. To overcome structural changes in the weldments the computational packages can be effectively used for analyzing the changes in its life. Inconel eralloys have excellent mechanical properties and are used in the industrial applications. The present simulation is carried out for gle pass butt-joint. Simulation studies are used for effective selection of process parameters for improving mechanical properties in weld structures. In this work, coupled thermo-mechanical simulation process was carried out for predicting the temperatures, tortion and residual stress distribution in the weldments using Finite element analysis at the transverse direction on the welded surface.

ywords: *GTAW welding process, Heat flux, FEA, Transientanalysis, Residual stress.*

Introduction

lding is one of the important manufacturing process and onel materials are typically used in the manufacture of ships, omobiles, chemical industries, gas turbine components and ospace etc. In weld structures, the weld residual stresses and tortions are caused due to the presence of localized heat in the ld beads. Distortion in weldments leads to inaccuracy in dimen-ns and causes difficulty during assemblies and increases the rication overheads. Changheui Jang et al[1] have reported the similar welding for understanding the behavior of crostructural and mechanical properties in the weldments.

lding process includes transient thermal heating and undergoes pansion and contraction, based on the physical properties of the terials. The welded components will be subjected to residual esses and undergo distortion in the structures. The welding nulation of the butt joints with thermal history, residual stresses d distortion in weldment for similar and dissimilar weldings re been carried out in various zones in weld surface[2-3]. The similar joining of SS316 to IN182 was carried out to study the cro hardness and micro structural properties[4]. A three-nensional model of the joint for tube-block with J-groove for stenitic stainless steel was simulated using Quick Welder soft-re to understand the residual stress and distortions developed in lti-pass joints [5].

lding of thin plate structures was simulated for distortions ich cause an effect in the assembly of the structures. The weld-distortion of weldments was estimated by simulation with two computational approach by a thermo-elastic–plastic finite ment method and an elastic finite element method [6-7]. The and three-dimensional welding simulations on stainless steel e SUS304 by GTWA was carried out with ABAQUS finite ment analysis for understanding the thermal behavior of the terial transient condition that leads to residual stress in the sim-ted structures [8]. The welding simulation on stainless steels of different grades have been reported with two and three-dimensional finite element models using the appropriate heat flux for laser beam and arc welding process to be aware of heat transfer and its response on distortion and residual stresses [9-10]. Simulation of welding of multipass pipe girth thick plate was investigated with two-dimensional axisymmetric model using finite element analysis for residual stress [11].

In this paper, thermo-mechanical analysis has been carried out for the temperature distribution and studied residual stress distribution with single pass butt welded joint of Inconel 182 alloys.The double ellipsoidal heat flux was used for simulation,which helps to optimise parameters for reducing the residual stresses in the weldments.

2. Finite Element Analysis

For the analysis, the thermal element SOLID 90[12] which is a higher order version of the three dimensional eight node thermal element SOLID70 and has 20 nodes with a single degree of freedom, temperature at each node is used. The 20-node elements have compatible temperature shapes and are well suited to model curved boundaries. If the model containing this element is also to be analyzed structurally, the element should be replaced by the equivalent structural element. The geometry, node locations, and the coordinate system of the element are shown in Fig.1. Fig.2 shows the well known double ellipsoidal heat source model, which was proposed by Goladk[13] for three-dimensional numerical welding simulation for arc welding process. The temperature dependent thermal and mechanical properties are shown in Fig.3a and structural properties like yield strength, young modulus Poisson's ratio and thermal expansion are shown in Fig.3b.

DESIGN OF FUZZY LOGIC CONTROLLER OF RESIDENTIAL ELECTRIC WATER HEATERS

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ABSTRACT:
With the impending deregulation of electric utility industry, customer satisfaction with utility services will be crucial. Utilities will need to place a greater emphasis on their customer's preferences and desires. This paper describes a fuzzy logic-based control strategy for shifting the average power demand of residential electric water heaters from period of high demand for electricity to off-peak periods. A minimum temperature for hot water, defined as customer comfort level, is used as a control variable. Water temperature is not allowed to fall below the minimum temperature set by the customer. Simulation result show that the proposed strategy can shift the average power demand of residential water heater to improve the load factor of residential load profile.

Key words: Fuzzy Logic control, mat lab tool box, Electric water Heater.

I. Introduction:

An Englishman Benjamin Maugham, in 1868 invented the first instant water heater called "The Geyser", a device where the water was heated as it flowed into the bath. They were known to be quite dangerous.Maughn's invention influenced the designs of a Norwegian mechanical engineer by the name of Edwin Ruud, who immigrated to Pittsburg. Ruud who invented the electric water heater (automatic storage) in 1889, founded the Ruud Manufacturing Company, which is still in operation today, and pioneered the advancement of water heaters, in both the residential and commercial market.

Population growth along with technological growth force the utility companies to continue struggling to meet the ever-increasing need for electricity. With the majority of residents conforming to the 8 AM-5PM work schedule, the utility companies experience overwhelming demand peak associated with large amount of power being consumed at the same time. Complementing this effect are periods of low demand. Although over a period of time, the average amount of power consumed by community may be easily generated by a utility, that utility still has to provide enough generation to meet its highest power demand peak. It is in the best interest of the utility companies as well as the consumer to try to reduce these high peak demand periods and out their power demand profiles as much as possible.

One way this can be accomplished is by controlling residential electric water heaters. The Electric water heater accounts for the single largest contributor to the total power consumption of a residence. Existing electric water heater DSM (Demand-side management) strategies focus on on/off control of the water heater, where a group of heater are disabled during certain periods of time using a direct load control strategy [5].When water heater are energized, they are either on consuming a fixed amount of power , i.e.4.5kW,or they are off. the paper presents a fuzzy logic based variable power control strategy, where the power consumed by the water heater can be controlled based on the information available from the water heater such as water temperature, maximum and minimum water temperature allowed (or desired),and distribution level power demand. Based on the status of the above variables, the fuzzy controller will determine

NANO SCALED LIB/STATCOM FOR POWER QUALITY IMPROVEMENT IN A GRID INTERCONNECTED RES

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Abstract
The Renewable energy systems, particularly 'Wind Energy' development, showed its remarkable growth in the recent years, that can create pollution less and environment friendly atmosphere. The Nano Scaled Li-ion batteries are getting enormous attention as power sources and energy storage devices in Renewable energy system. Interconnecting the wind energy into the grid effects the power quality due to variable wind speed components. This paper shows the existence and mitigation of power quality problem due to installation of wind turbine with the grid i.e Harmonics. LIB plays critical role under clean energy system because it contribute for reduction of greenhouse gas emission. The performance of LIB is improved by developing high energy density electrode materials at Nano scale. A novel Nano Scaled LIB/STATCOM control scheme for grid connected wind Energy system has been developed using the MATLAB/SIMULINK to mitigate the power quality problems. In this the STATCOM is inputted by the Nano Scaled Li-Ion Battery Energy Storage system (LIB) it rapidly injects or absorbed reactive power to stabilize the grid system. Finally the results with LIB/ STATCOM, with STATCOM and without LIB and without LIB/STATCOM are compared and a mark reduction in total harmonic reduction is observed.

Keywords: LIB Li-ion battery energy storage; Nano Scale; PQ power quality; STATCOM;

I. INTRODUCTION

There is a current global need for clean and renewable energy sources where renewable energy sources can curb our need for fossil fuels. Fossil fuels are non-renewable and require finite resources, which are dwindling because of high cost and environmentally damaging retrieval techniques. So, the need for cheap and obtainable resources is greatly needed. The efficient and more feasible alternative option is solar, wind etc. Nano technology is the best tool for achieving breakthrough in Li-ion battery electrode material. In order to improve the performance of batteries it is desired to develop high energy density cathode materials using Nano materials. Now a day's Lead acid batteries have been used for solar electric systems but Li-ion offers higher energy density, longer cycle life, and no memory effect compared to lead acid batteries. [1]-[2]

A conventional STATCOM is a shunt-connected device which consists of a Voltage Source Inverter (VSI) and a dc capacitor. Since the dc capacitor is not a bulk energy storage device, the STATCOM does not have the ability of active power compensation. If an energy storage system, such as a Nano Scaled Li-ion battery, is connected to the dc capacitor, the power regulation ability of the STATCOM can be expanded to both reactive and active power compensation. The Active power control function can work faster than conventional synchronous generators and so, it has better performance. On the other hand, the reactive power control can enhance the power quality of

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Novel Method for Loss Reduction and Voltage Profile Improvement with Multiple DGs

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Abstract— Distributed generation (DG) can be integrated into distribution systems to meet the increasing load demand. This paper discusses the sizing and sitting issue of DG placement in radial distribution systems using novel method. The main objective of the work is to minimize the active and reactive power loss and enhance voltage profile of overall system. This paper presents a methodology for optimal distributed generation (DG) location and sizing in distribution systems. The main objective of the added DG units is minimizing the total electrical network losses with acceptable voltage profile. The effectiveness of the novel method has been successfully tested on IEEE 33 bus radial distribution system in ETAP software and the results are found to be in very good agreement.

Index Terms— Voltage profile, real power losses, reactive power losses, radial distribution system, distributed generation,

---

1 Introduction

The electric utility system is usually divided into three subsystems which are generation, transmission, and distribution. The distribution system is commonly broken down into three components: distribution substation, distribution primary and secondary. At the substation level, the voltage is decreased and the power is distributed in smaller amounts to the customers. Consequently, one substation will supply many customers with power. Thus, the number of transmission lines in the distribution systems is many times that of the transmission systems. Furthermore, most customers are connected to only one of the three phases in the distribution system.

When you on the traditional power grid energy generation and distribution was relatively simple. The generator produced electricity at plant and the transmission system carried electricity from the plant to substations. At the substation, voltage was reduced and electricity continued to travel along the distribution system where transformers converted into voltage used by customer. At the customer site electricity passed through the meter which recorded usage as electricity was consumed. Energy flow was essentially one way. On a smart grid with distributed generation, energy can be generated close to the point of use and those who produce this power have the option to resell it to the utility [1],[2].

A generator is installed behind the metre to provide power. When this generator is not in operation power can be drawn from the grid. However, if there is an outage or when power prices peak, users can go off-grid and use a private generator to produce power. Solar, wind and thermal energy are renewable sources that can generate energy close to the point of use. Unlike major power stations, renewable energy resources can be installed in small increments and they have extremely low on-going costs. Though renewable energy resources are less predictable than the power generated by traditional means, hybrid systems can utilize both renewable and traditional power. With access to distributed generation resources within a smart grid, utilities can configure the existing systems to meet peak power needs and diversify the range of energy resources to increase the reliability of energy flow [3],[4]. For customers distributed generation supports

(i) Reduced energy costs

(ii)Reduced reliance on fossil fuels and

(iii) Increased use of renewable resources

Despite its relative unpredictability, renewable energy can fit with the load curve. For instance, in summer the sun produces high energy during the hardest part of the day when air conditioning is required, so solar energy is in affect converted into electric energy for cooling. Within the smart grid, integrated into the smart home and monitored by smart metering distributed generation is a new paradigm for energy distribution and use. For the first time energy flows to users as well as away from the users enabling utilities and their customers to work together to ensure that power is high quality, reliable, green and low cost.

Distribution systems hold a very significant position in the power system since it is the main point of link between bulk power and consumers. Effective planning of radial distribution network is required to meet the present growing domestic, industrial and commercial load day by day.

2 Load Flow Analysis

Consider a branch connected between buses 1 and 2 as shown in Fig. 1

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HYBRID SIGNED DIGIT PARALLEL AND MULTI OPERAND BCD ADDERS

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June 25, 2018

Abstract

Decimal Arithmetic is having its own significance in many fields like commercial, financial, industrial and scientific applications. It plays a vital role in Floating point and Fixed point Decimal Processors. Adders and Multipliers are basic building blocks of any arithmetic unit. This paper presents a new method for the decimal signed digit addition based on the vinculum digit set {-5, 5} where the delay associated with carry generation and propagation is significantly reduced. The proposed Hybrid signed digit adder, adds two N-digit operands using binary fast adders in parallel. The correction logic is parallel applied along with one previous stage hybrid carry. This reduced the critical path delay very significantly. Multi operand BCD addition up to 8 operands is successfully implemented using the above mentioned parallelism in binary tree method. The proposed multi-operand BCD adder is 3 times faster compared to the method proposed in Signed Digit Adder multi operand adder of [17]. All the designs are implemented in Verilog HDL and tested exhaustively on FPGA and cadence digital encounter tools 0.18m technology and the results show that the proposed

EFFICIENT VEDIC SIGNED DIGIT DECIMAL ADDER

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ABSTRACT:
Decimal arithmetic is convenient for financial calculations and other database manipulations as compared to binary arithmetic. Research is still going on to have specialized decimal arithmetic hardware processing units to make these tasks more efficient in terms speed, power and hardware to supports these applications. In this paper, we propose a new approach to decimal addition that is simple in concept, appealing and efficient in terms of speed and hardware. The proposed decimal adder utilises a signed 2's complement vinculum representation of the decimal numbers. The design although generates a dual carry, i.e. a positive and a negative carry, analysis of the adder has revealed a much lower probability of carry generation as compared to the conventional decimal adder allowing the possibility of parallel decimal addition. The proposed VBCD adder is tested up to 16-digit on vertex 6 FPGA platform and also on 180 nm Cadence digital Encounter Tools

Keywords: *BCD Adder, BCD Subtractor, Two's complement number system, Vinculum numbers*

1. INTRODUCTION:

Decimal Arithmetic plays a very vital role in many financial, business and commercial applications for which binary arithmetic is not suitable. Thus in such systems the decimal hardware eliminates the need of internal binary conversions. From the last decade lot of research is going on decimal arithmetic [18] [14]. The literature available mostly concentrates on conversion of Decimal to Binary and from Binary to Decimal Numbers with Encoding and Decoding schemes like commonly available weighted and un-weighted codes, ASCII and EBIDIC codes [7] [17]. In recent literature there is a growing interest for computing Decimal arithmetic using Vedic mathematics [2] [19]. Our studies show that Vedic mathematics is a promising and emerging field for decimal arithmetic. Survey shows that faster and efficient arithmetic circuits can be designed using Vedic mathematics [8].

In this paper we have proposed a new method for decimal addition and subtraction using two's complement number system and Vedic vinculum number representation. Our simulation results indicate that this approach is viable and efficient. The synthesis results show a good amount improvement in speed.

The outline of the paper is arranged as follows. In Section 2 Vedic Vinculum number representation is explained with suitable examples. In Section 3 existing BCD Adder/Subtractor is given. In Section 4 Proposed Single digit VBCD Adder. In Section 5 Extension of VBCD Adder to 64 bit is proposed. Synthesis results are discussed in Section 6 and Conclusion with Future scope is provided in Section 7.

2. BASIC BACKGROUND ON VEDIC VINCULUM NUMBER REPRESENTATION:

It is a well-known and accepted fact that in ancient India (Vedic era) Vedic civilizations were known for being skilled in geometry, algebra and computational mathematics [8]. Even complex mathematical concepts like irrational numbers, calculus etc. was known to exist. They were studied and compiled by a Hindu scholar and mathematician, [Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaj] during the early part of the 20th century [8] [2] [19].

In this paper we have made an attempt to use the vinculum number representation to solve the problem of BCD Addition and Subtraction.

2.1Vinculum Representation of Numbers

Vinculum number representation allows BCD digits to take values from -5 to 5. If a higher digit, say 7 occurs it has to be converted into $1\bar{3}$. This type of representation allows only smaller +ve and –ve digits and hence it significantly reduces the probability of carry generation as illustrated in the Section 6.

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A NOVEL APPROACH TO THE LEARNING OF VINCULUM NUMBERS IN TWO'S COMPLIMENT METHOD FOR BCD ARITHMETIC OPERATIONS

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ABSTRACT: This paper proposes a new approach of representing decimal number system using Vinculum number representation. Vinculum number system consists of numerals 0,1,2,3,4,5 same as decimal number system and 6,7,8 and 9 are represented using negative numbers less than or equal to 5. Therefore Vinculum number system consists a set of numbers as {0, 1, 2, 3, 4, 5, −4, −3, −2, −1}. Hence complexity of higher order numerals like 6,7,8 and 9 are converted into less complex numbers. Vinculum is the Vedic method of representing decimal number system. Decimal numbers are representing in Binary Coded Decimal numbers for getting compatibility with Computer systems. Similarly we have used 2's complement number system for representing Vinculum numbers. This helped in representing signed Vinculum numbers. A unique set of tuples are represented in Vinculum number system which are suitable for any decimal arithmetic operation.

Keywords: Decimal numbers, BCD numbers, Vinculum numbers

Introduction:

Decimal Arithmetic plays a very vital role in many Finance, Business and Commercial Applications for which binary arithmetic is not suitable. From the last decade lot of research is going on decimal arithmetic and Decimal Floating point number systems [4][5] . The literature available mostly concentrates on conversion of Decimal to Binary and from Binary to Decimal numbers with various Encoding and Decoding schemes like weighted, non-weighted, Excess 3 code, Gray code etc. [1] [2] [4][6]. In recent literature there is a growing interest for computing Decimal arithmetic using Vedic mathematics [13] .The studies show that Vedic mathematics is a promising and emerging field for decimal arithmetic systems.

In this paper we have proposed a new method for decimal addition and subtraction using two's complement number system and Vedic vinculum method. Two's complement approach is normally used in binary addition and subtraction. To our knowledge very little literature is available on BCD Addition and Subtraction using Vedic mathematics. We have tried to investigate the use of 2's complement number system to represent vinculum numbers to solve the problem of BCD Addition and subtraction. Our Analysis shows that this approach is viable and efficient. Theoretical analysis shows that the number of carry bits generated from one digit to other digit are very less when compare to conventional (decimal) number systems.

The outline of the paper is arranged as follows. In Section 2 Various forms of Binary number systems are presented. In Section 3 Decimal number system using vinculum method were explained and concepts of Vinculum numbers, its Algorithm with examples are discussed, in Section 4 and Conclusion with Future scope in Section 5.

2 Overview of Number systems:

All human beings are familiar with their regional languages but one number system is common which is nothing but Decimal number system. Computers does not understand the words and letters of various languages. All those are translated into numbers where computers talk and understand each other. Although we are comfortable with decimal number system a student or a mathematician must be aware of various number systems and their working principle and their conversions from one form to another in various aspects.

2.1 Digits:

Before numbers are converted from one number system to another, the digit of a number system must be understood. The first digit in any numbering system is always a zero. For example, a base 2 (binary) numbers contains 2 digits: 0 and 1, a base 8 (octal) numbers contains 8 digits: 0 through 7 , a base 10 (decimal) numbers contains 10 digits 0 through 9, a base 16(Hexa means six and decimal means 10) numbers contains 16 different digits:0 through 9 and 10 to 15 in decimal is represented as A,B,C,D,E and F.

Once the digits of a number system are understood, larger numbers are constructed by using positional notation. As in decimal the position to the left of the units position was the tens position, the position to the left of the tens position was the hundreds position and so forth. Here, the units position has a weight of 10^0, or 1; the tens position has a weight of 10^1, or 10; and the hundreds position has a weight of 10^2, or 100. The exponential powers of the positions are critical for

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LOW POWER TEST PATTERN GENERATION USING TEST-PER-SCAN TECHNIQUE FOR BIST IMPLEMENTATION

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ABSTRACT

This paper introduces the function of test cases with minimal power for Built-In-Self-Test (BIST) implementation. This method intends Test-Per-Scan (TPS) based test cases using Multiple Single Input Change (MSIC) architecture. Multiple SIC patterns are developed by using EX-OR operation of twisted ring counter and test design algorithms like Linear Feedback Shift Register (LFSR),Bit-Swapping LFSR (BSLFSR), and Cellular Automata (CA). These patterns are used to a diminish number of transitions in the test patterns that are generated. The preferred method uses Test-Per-Scan technique for generating Multiple SIC test patterns. TPS diminished the power consumption during test mode. The seed generator used in TPS is modified LFSR's i.e., BS-LFSR, Cellular Automata (CA). BS-LFSR is composed of with an LFSR with a multiplexer. In CA, it also presents a variation on a BIST technique, which is from a one-dimensional cellular automaton; the pseudo random bit generator is generated. The proposed Hybrid Cellular Automata (HCA) using the rules 90 and 150 to generate the pseudo random designs. Moreover, the CA implementations illustrates properties of data compression like LFSRs and that they exhibit locally and with topological consistency significant attributes for a VLSI design. In this proposed method, LFSR is replaced with BS-LFSR, and HCA. Simulation and synthesis outcome with ISCAS c432 benchmark determine that Multiple SIC can reduce the power consumption.

Index Terms: BIST, MSIC, LFSR, BSLFSR, CA, HCA, circuit under test, test-per-scan, single input change, test response analyzer, pseudo random generator.

1. INTRODUCTION

Built-In-Self-Test scheme can adequately minimize the more complex VLSI analysis problems, by generating test hardware into the Circuit-Under-Test (CUT). The Linear Feedback Shift Register (LFSR) is generally exploited as Test Pattern Generators (TPGs) and Test Response Analyzers (TRAs) in traditional BIST technique. Amainsnag of these techniques is that the pseudorandom test cases produced by the LFSR causes a notably huge switching activity in the CUT, which can lead to enormous power dissipation and also blow the circuit and reduce the product yield. The LFSR generally requires very lengthy pseudorandom patterns in order to attain the required fault coverage in BIST implementation.

A. History work on BIST

There are a number of contrives that are used to generate design necessary for testing CUT. It has been founded that power consumption is more in test mode comparatively with normal mode [12]. The main idea behind low power techniques is to minimize the power consumption in test mode. Different kinds of test generation methods are required to develops table Built-In Self-Test (BIST) techniques. The utmost familiar test pattern design generation is based on pseudorandom pattern generators (PRPGs). The simple hardware on-chip test generation can be developed by pseudorandom tests patterns. Therefore, there are two major forms of PRPGs which is derived. Generally, the linear feedback shift registers and 1- Dimensional (1-D) Linear Hybrid Cellular Automata (LHCA) are major forms of PRPGs.

In spite of few coincidences, the series of states is consistently distinct between the LHCA and the LFSR, the LHCA can generates far good randomized test patterns [21]. The CA-based test generators will be an option to traditional LFSR algorithms. Further to meliorated randomization attributes, novel pseudorandom test design algorithms also have benefit in that they can be implemented for only contiguous neighbor communication and the physical length of the pattern generator. These can be elevated or diminished by only summate or deducting the cells. However, the investigation of aliasing function is a secondary controllable job for the CA than LFSR. The architecture in [7], presents Seeded Autonomous Circular Shift Register (SACSR) producing Single-Input-Change (SIC) patterns of maximum unique vectors. One of the ways to minimize power consumption is by reducing the transitions between the consequent patterns. Many techniques are introduced to minimize the transitions. The architecture in [3] presents Bit Swapping LFSR which is unlike from conventional LFSR reduces 33% of the transitions. BIST technique should generate test sequences with shallow power and area overhead and high fault coverage.

The architecture in [8] the introduced method has to decrease scan input bit transitions along operations of scan shifting. The architectures in [9], [11], [13] introduced various new techniques for reducing switching activities and also area overhead. The architecture in [2] introduces a new technique for generating the test designs with only single bit change compared with the previous patterns and generated using the XOR of the counter output with LFSR. The architecture in [5] power is

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SHORT COMMUNICATION

Attenuation Effect as a Tool to Explain sp^3 Carbon (–CH_2–) is a Good Electron Insulator and a sp^2 Carbon (–CH=CH–) is a Good Electron Transmitter: An Undergraduate 1-h Chemistry Classroom Tutorial

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Abstract Physical basis of chemical reactivity in organic molecules was to determine the electronic effects which govern the rate of a reaction put forth by the substituents during the course of a given reaction. This is known as "*substituent effect.*" This concept was first developed by Hammett in the form of a linear free-energy relationship (LFER) popularly known as "*Hammett equation.*" This substituent effect would generally attenuate in an exponential manner as the distance between the reaction center and the substituent increases. This was developed by Williams (Free-energy relationships in organic and bioorganic chemistry, Royal Society of Chemistry, Cambridge, 2003) in the form of an empirical exponential equation. Using the Hammett equation and with help of Williams 2003 explanations on attenuation effect, we have tried to explain why a sp^3 carbon is a good σ-electron insulator and a sp^2 carbon is a good π-electron transmitter.

Relevance of the work in broad context All the scientists/professors who are involved in the research of studying the substituent effects (Linear Free-Energy Relationships) that is application of Hammett's equation will be interested in the outcome of this article. The outcome of this article will be useful for research students involved in the application of Hammett's equation and reaction mechanisms.

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Keywords Hammett equation · Attenuation effect · Electron insulator and electron transmitter · Classroom tutorial

Introduction

The term "attenuation" in general implies that it is the exponential depletion of some property either physical or chemical with time, medium and distance. In this direction, study of the attenuation effect in aromatic [2, 3] and aliphatic systems [4] is a major breakthrough from our laboratory not reported earlier. The ultimate conclusion is the hybridization of carbon would eventually affect the magnitude of Hammett ρ in the carboxylic acid dissociation equilibriums [2, 3]. Using the magnitude of Hammett ρ values of dissociation equilibriums of homologous series of carboxylic acids, we have given a simple and lucid explanation for why sp^3 carbon (–CH_2–) is a good electron insulator and a sp^2 carbon (–CH=CH–) is a good electron transmitter.

Methods

All chemical structures were drawn using "Chemdraw" software.

Discussion

Hammett equation,

$$\log K_X/K_H = \rho\sigma \text{ or } \log k_x/k_H = \rho\sigma$$

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The '*Yard Stick*' to Interpret the Entropy of Activation in Chemical Kinetics: A Physical-Organic Chemistry Exercise

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Abstract No physical or physical-organic chemistry laboratory goes without a single instrument. To measure conductance we use conductometer, pH meter for measuring pH, colorimeter for absorbance, viscometer for viscosity, potentiometer for emf, polarimeter for angle of rotation, and several other instruments for different physical properties. But when it comes to the turn of thermodynamic or activation parameters, we don't have any meters. The only way to evaluate all the thermodynamic or activation parameters is the use of some empirical equations available in many physical chemistry text books. Most often it is very easy to interpret the enthalpy change and free energy change in thermodynamics and the corresponding activation parameters in chemical kinetics. When it comes to interpretation of change of entropy or change of entropy of activation, more often it frightens than enlightens a new teacher while teaching and the students while learning. The classical thermodynamic entropy change is well explained by Atkins [1] in terms of a sneeze in a busy street generates less additional disorder than the same sneeze in a quiet library (Figure 1) [2]. The two environments are analogues of high and low temperatures, respectively. In this article making use of Eyring equation a factor usually called '*universal factor*' is derived and made use as a '***yard stick***' to interpreting the change in entropy of activation for physical or physical-organic chemistry senior undergraduate and graduate students' class-room.

Peter Atkins

Figure 1.

Keywords: *entropy, universal factor, kinetics*

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1. Introduction

Thermodynamic properties like enthalpy, free energy and entropy of several thousands of organic and organometallic compounds were well documented and a very authoritative explanations and expert critical comments were offered [3,4]. As shown in the Figure 2, as an example taking any property (X = G free energy, or H enthalpy, or S entropy), thermodynamic and activation parameters could be distinguished between thermodynamics and kinetics. The nature of any property accompanied in chemical reactions in terms of energy considerations is nothing but an amalgamation of activation barrier ($\Delta X^{\neq}$) and thermodynamic driving force (ΔX^{o}). Marcus equation [5,6,7] is a successful treatise for treating kinetic data of electron transfer reactions to separate activation ($\Delta X^{\neq}$) and thermodynamic quantities (ΔX^{o}). The change in thermodynamic quantities could be interpreted in terms of

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Cooxidation not to be Confused with Catalysis: A Chemical Education Article to Physical-organic Chemists

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ABSTRACT

Two substrates (A) and (B) are oxidized separately by an oxidant (Oxi) with the rate constants k_1 and k_2 and they are oxidized taken together (A + B) under similar conditions with a rate constant k_3, if the value of $k_3 = (k_1 + k_2)$, then it is said to be an example of two reactions "going parallel". If the value of $k_3 >>>> (k_1 + k_2)$, then the redox process is termed as "co-oxidation" (Hasan and Rocek 1972, *JACS*). In this process in the mixture the two substrates are oxidized synchronously by a direct three electron transfer route if the oxidant happens to be Cr(VI) and by a direct four electron transfer route if the oxidant happens to be Mn(VII) (Jagannadham *et al.*, 1986, *Oxidation Communications*). It was realized that the essential condition of the synchronous oxidation of two substrates A and B is that one substrate must have two functional groups and the other must have one functional group or vice-versa. The compound with two functional groups must be a good chelating agent with the metal ion oxidant. A substrate (A) is oxidized by an oxidant (Oxi) with a rate a constant k_4 and is oxidized in presence of a catalyst (Cat) with a rate constant k_5, if $k_5 > k_4$ the redox process is termed as "catalyzed process". It is to be noted that in the catalytic process the catalyst (Cat) is not oxidized and its concentration does not change during the reaction. It only increases the rate of oxidation with lower activation energies. If $k_5 = k_4$ it is to be understood that there is "no catalysis". If $k_5 < k_4$ it is to be understood that the catalyst is called a negative catalyst or "inhibitor" and the reaction goes with higher activation energy. In this paper a lucid description is given for the two processes "co-oxidation" and "catalysis" with putative examples.

Keyword: Cooxidation,Catalysis, Chemical education.

INTRODUCTION

Hasan and Rocek were the first to report a direct synchronous three electron oxidation process where in isopropyl alcohol and oxalic acids were oxidized[1]. Later several publications appeared from his laboratory[2-18]. Sequel to Rocek's discovery[1] of one step three electron oxidations several

A Class Of Univalent Analytic Functions With Fixed Second And Third Coefficients

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Abstract: In this paper we defined a new class of univalent and analytic functions with fixed second and third Taylor coefficients. Coefficient condition, starlikeness and convexity, extreme points, growth and distortion properties for this class are investigated.

IndexTerms – Univalent function

I. INTRODUCTION

Let S be the class of functions of the form $f(z) = z + \sum_{n=2}^{\infty} a_n z^n$ that are analytic and univalent in the unit disk $= \{z \in \mathbb{C} : |z| < 1\}$. Let T be the subclass of functions of S which are of the form

$$f(z) = z - \sum_{n=2}^{\infty} a_n z^n, \quad a_n \geq 0, \ n = 2, 3, \ldots \tag{1}$$

in U and C be the subclass of functions of T which are convex in U. We have $f \in C$ if and only if $zf' \in T$.

Now we introduce a subclass $T(b, c, B_n) \subseteq T$ by fixing a_2 and a_3, for $0 \leq b \leq \frac{1}{4}$, $0 \leq c \leq \frac{1}{12}$ and $B_n \geq n(n+1)$ for $n \geq 2$,

$$T(b, c, B_n) = \{f(z) \in T: f(z) = z - bz^2 - c\, z^3 - \sum_{n=4}^{\infty} a_n z^n, \ \sum_{n=3}^{\infty} B_n\, a_{n+1} \leq 2b - c\, B_2\}.$$

Let $C(b, c, B_n)$ be a subclass of functions of $T(b, c, B_n)$ which is convex in U.

This paper consists of two sections. In section 1, we find the coefficient conditions for starlikeness and convexity of the class $T(b, c, B_n)$. In section 2 we find extreme points, growth and distortion properties for the class $T(b, c, B_n)$.

SECTION 1

We need the following definitions from [1].

Definition1: [1] A function $f(z) \in S$ is said to be starlike of order α $(0 \leq \alpha < 1)$ in U, if it satisfies the inequality $Re\left[\frac{z f'(z)}{f(z)}\right] > \alpha$ for $z \in U$. The class of starlike functions of order α is denoted by $S^*(\alpha)$.

Definition 2: [1] A function $f(z) \in S$ is said to be convex of order α $(0 \leq \alpha < 1)$ in U, if it satisfies the inequality $Re\left[1 + \frac{z f''(z)}{f'(z)}\right] > \alpha$ for $z \in U$. The class of convex functions of order α is denoted by $C^*(\alpha)$.

We have $f \in C^*(\alpha)$ if and only if $zf' \in S^*(\alpha)$.

We start with a coefficient characterization for the functions of T to be in the class $T(b, c, B_n)$.

Theorem-1

The function $f(z) = z - bz^2 - cz^3 - \sum_{n=4}^{\infty} a_n z^n$, $z \in U$ is in the class $T(b, c, B_n)$ if and only if $\sum_{n=3}^{\infty} n(n+1)\, a_{n+1} \leq 2b - 6c$. The result is sharp.

Proof: If $f(z) = z - b\, z^2 - c\, z^3 - \sum_{n=4}^{\infty} a_n z^n$, $z \in U$ belongs to the class $T(b, c, B_n)$,

Then by the definition, we have $\sum_{n=3}^{\infty} B_n\, a_{n+1} \leq 2b - cB_2$

This gives $\sum_{n=3}^{\infty} n(n+1)\, a_{n+1} \leq 2b - cB_2$

or $\sum_{n=3}^{\infty} n(n+1)\, a_{n+1} \leq 2b - c.2.3$

this shows $\sum_{n=3}^{\infty} n(n+1)\, a_{n+1} \leq 2b - 6c$ (2)

Now, suppose that $\sum_{n=3}^{\infty} n(n+1)\, a_{n+1} \leq 2b - 6c$

Then $\sum_{n=2}^{\infty} n\, a_n \leq 1$.

Therefore $f(z) \in T$ by [3].

Crystallization and Dielectric Properties of $PbTiO_3$ based Glass Ceramics

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Abstract. Glass samples with composition (50 - X) PbO - (25 + X) TiO_2 - 25 B_2O_3 (where X =0, 5, 10 and 12.5 mol %) were prepared using conventional quenching technique. These glass samples were converted to glass ceramics by following two stage heat treatment schedule. The XRD results in the glass ceramics revealed the formation of tetragonal lead titanate as a major crystalline phase. The SEM results show rounded crystallite of lead titanate. The ferroelectric nature of all the glass ceramic samples is confirmed by P - E hysteresis measurements. The extended heat treatment of glass ceramic samples at 593K for 10 h exhibited saturated hysteresis loops with higher values of remnant polarization.

1. INTRODUCTION

Glass ceramics are polycrystalline solids prepared by controlled crystallization of glasses. Crystallization is accomplished by subjecting suitable glasses to a carefully regulated heat treatment schedule which results in nucleation and growth of crystal phases within the glasses. This method of making a ceramic material represents a radical departure from conventional ceramic preparation processes and it offers a number of important advantages. Since molten glass can be obtained in a homogeneous condition, uniformity of chemical composition can easily be achieved for glass ceramics. The homogeneity of the parent glass together with the controlled manner in which the crystals are developed results in glass ceramic (gc) materials having a very fine grained uniform structure free from porosity. The other unique characteristics, such as no ageing or depoling problems and good stability at high temperature, high-pressure and in harsh environments, make glass ceramics attractive for use in variety of applications. Realizing the advantages of the glass ceramic process, several attempts have been made to produce glass ceramics having high permittivity, low dielectric loss, high electrical resistance and high dielectric breakdown strength by precipitating various ferroelectric phases were crystallized. Prominently these phases are $BaTiO_3$, $LiTaO_3$, $NaNbO_3$, Pb_5GeO_{11}, $LiNbO_3$, $SrTiO_3$, $KNbO_3$, KNN, PZT and $PbTiO_3$. The main emphasis in these investigations was on the study of dielectric and electro optic properties as a function of composition, heat treatment and grain size.

However, the systematic study of crystallization and dielectric properties of $PbTiO_3$ based glass ceramics has not been reported so far. Hence, in the present work the content of TiO_2 was increased by decreasing PbO content and the glass former (B_2O_3) content was kept fixed with an idea to restrict the volume fraction of residual glass phase and to improve crystallization, dielectric and ferroelectric properties of $PbTiO_3$ based glass ceramics.

2. EXPERIMENTAL

Glasses with composition (50-X) PbO - (25+X) TiO_2 - 25 B_2O_3 (where X = 0, 5, 10 and 15 mol %) were prepared from the high purity ingredients heated in an alumina crucibles at 1373 K-1523 K for 1h. The melt was homogenized by stirring it before quenching into aluminium mould at room temperature. The resultant glass

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Structural, Magnetic and Magnetoreactance Studies In $NiFe_{2-x}R_xO_4$ ($x = 0, 0.05$; R = Y, Yb and Lu)

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Abstract. Structural, magnetic and magnetoreactance (*mr*) properties of $NiFe_{2-x}R_xO_4$ ($x = 0, 0.05$; R = Y, Yb and Lu) compounds were investigated and the results are discussed and presented in this paper. Rietveld refined X-ray diffraction (XRD) patterns and Raman spectroscopy revealed the cubic inverse spinel phase for all the compounds investigated. The former also identified small amounts of $RFeO_3$ as the secondary phase. Lattice constant values were increased upon partial substitution of Fe^{3+} by R^{3+} (R = Y, Yb and Lu). Magnetization measurements revealed that the magnetic moment of R^{3+} (R = Y, Yb and Lu) substituted compounds decreased compared with $NiFe_2O_4$. *mr* was measured at 3 *kHz* and 3 *MHz* both longitudinal (*LT*) and transverse (*TR*) configuration. A maximum *mr* of 54 % was observed in Y^{3+} substituted $NiFe_2O_4$ in *TR* mode.

I. INTRODUCTION

Gaint Magnetoimpedance (*GMI*) effect is the change in impedance of a ferromagnetic material with the application of a dc magnetic field and is defined as, $MI = \left[\frac{Z(H)-Z(H_{max})}{Z(H_{max})}\right] \times 100$. The *GMI* effect is observed in wires, ribbons, tubes and thin films [1]. Small and negative magnetostriction has been reported to lead to large *MI* values [1-3]. Recently *MI* has been reported in Mn-Zn ferrite at different frequencies and has a maximum value of 61.2 % at 4 *MHz* [4]. Many researchers have reported *MI* in perovskites [5]. Since ferrites are insulators, change in the reactive part of the impedance rather than the skin effect gives rise to the *MI* in ferrites which is nothing but magnetoreactance (mr), $mr = \left[\frac{X(H)-X(H_{max})}{X(H_{max})}\right] \times 100$.

In the present investigations, R^{3+} (= Y, Yb and Lu) was chosen to partially substitute the lighter and smaller Fe^{3+} (ionic radius of Fe^{3+} = 0.63 *Å* and that of Y^{3+} = 0.89 *Å*, Yb^{3+} = 0.86 *Å* and Lu^{3+} = 0.85 *Å*). In this paper, structural, magnetic, and magnetoreactance properties of $NiFe_{2-x}R_xO_4$ ($x = 0, 0.05$; R = Y, Yb and Lu) compounds are reported.

II. EXPERIMENTAL DETAILS

The starting materials NiO (99.96 %), Fe_2O_3, Y_2O_3, Lu_2O_3 and Yb_2O_3 (99.99 %) are used to prepare polycrystalline $NiFe_{2-x}R_xO_4$ ($x = 0, 0.05$; R = Y, Yb and Lu) compounds, by solid state reaction method. The powders of the starting materials were taken in stoichiometric ratios and ground in an agate mortar and pestle for 3 *h* and were heat treated in air at 1200 °C for 12 *h*. The phase formation of the samples was confirmed by powder X-ray diffraction (XRD) technique using a PANalytical (X'pert PRO) X-ray diffractometer employing Cu K_α radiation. Rietveld refinement was carried out using the GSAS program with EXPUGI interface. Raman active vibrational

Dielectric and Impedance Properties of $NiFe_{1.95}R_{0.05}O_4$ (R = Y, Yb and Lu)

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Abstract. The dielectric and impedance spectroscopic properties of $NiFe_{1.95}R_{0.05}O_4$ (R = Y, Yb and Lu) were investigated. The materials were prepared by solid state reaction and crystallized in the cubic inverse spinel phase with a very small amount additional phase of $RFeO_3$ (R = Y, Yb and Lu) as secondary phase. The scanning electron micrograph images clearly show grains (~2μm) which are separated by thin grain boundaries. The presence of all elements were confirmed by the energy dispersive X-ray elemental mapping. The frequency variation of ε' shows the dispersion, following the Koop's phenomenological theory, which considers the dielectric structure as an inhomogeneous medium of two-layers of the Maxwell-Wagner type. Impedance spectroscopic analysis indicates the different relaxation mechanisms, which corresponds to bulk grain and grain-boundaries. Their contributions to the electrical conductivity and capacitance of these materials were discussed in detailed.

I. INTRODUCTION

Ferrite materials have wide range of applications in the fields of electronics, optoelectronics, magnetics and magnetoelectronics due to their high saturation magnetization, large permeability, low eddy current losses and high electrical resistivity. Nickel ferrite crystallizes in inverse spinal structure and is a centro-symmetric magnetic material. Substitution of rare earth ion into the spinal structure has been reported to induce structural distortion and strains in the material [1]. Y, Yb and Lu doped $NiFe_2O_4$ have been prepared and their structural, dielectric and impedance spectroscopic properties were investigated. The objective of the this work is to study the bulk and interface phenomena over a wide range of frequencies in order to obtain information about the relaxation times present in these materials. The results obtained on the Y, Yb and Lu substituted Ni ferrites are presented and discussed in this paper.

II. EXPERIMENTAL DETAILS

The materials were prepared using the solid state reaction method. Powders of starting materials were NiO (99.96% pure), Fe_2O_3, Y_2O_3, Yb_2O_3 and Lu_2O_3 (all 99.99% pure) were ground in a agate mortar and pestle for 3 h and the mixtures were heat treated in air at 1200 °C for 12 h. Surface morphology was studied using scanning electron microscope (Model: Quanta 200) attached with energy dispersive X-ray (EDAX) equipment (for elemental analysis) along with Back Scattered Electron (BSE) imaging. The powders made into pellets, then sintered at 1330°C in air for 24 h, ensuring 95% densification and used for electrical measurements. Dielectric and impedance measurements were carried out employing 'Novocontrol Alpha broad dielectric analyzer'. Highly conducting silver paste was applied on both sides of the pellet and dried before the impedance and dielectric measurements.

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Behavior of Organic Compounds with Different Functional Groups based on Surface Tension, Ramsey-Shields-EÖTVÖS Constants (*k*), Order of Association (x) and Trouton's Rule

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Abstract

Hydrocarbons and organic compounds having different functional groups with hetero atoms have shown a discriminative behavior toward surface tension, EÖTVÖS constants (k), order of association (x) and Trouton's rule. This was explained in terms of associative and non-associative behavior of these compounds.

Article History

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Keywords:

Taft equation, Eötvös Constant, Ramsay-Shields equation, Trouton's rule, Order of Association, Hydrogen Bond Donor-Acceptor Sites (H_{ad}).

Introduction

Study on associative properties of aliphatic alcohols[1], aliphatic carboxylic acids[2], phenols[3], and aliphatic amines[4] based on their surface tension data, EÖTVÖS constants (k), order of association (x) and Trouton's rule is a major breakthrough from our laboratory hither to not reported earlier in literature.In the present study, various compounds like hydrocarbons, and compounds having different functional groups with different hetero atoms were taken to see the effect of these groups on surface tension, EÖTVÖS constants (k), order of association (x) and Trouton's rule.

Experimental and Data Source

All the surface tension data used in this article is from reference[2]. The detailed procedure for calculation of various parameters mentioned in table 1 are described in references 1-4.Thermo chemical data is from reference[6]. Taft σ^* values are from reference[7].

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Chemical Education

Does A Partition or Distribution Coefficient Exist For A Solute That Distributes Between Two *Miscible* Solvents?

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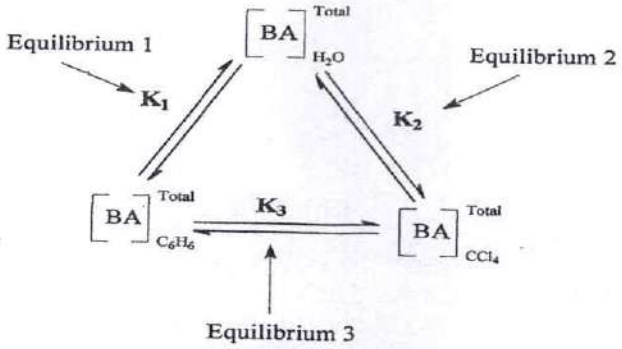
ABSTRACT

It is known that for any solute, the Nernst distribution law is between two solvents which are immiscible[1]. It is a well established fact that partition coefficient is meant for un-dissociated species and distribution coefficient is that for total concentration of the un-dissociated and dissociated solute[2]. At constant temperature a solute can distribute between two immiscible solvents so that the ratio of the amounts or concentrations of the solute in two solvents is constant. For all practical purposes and to avoid any confusion we have used the total concentration of the solute in this article.

Keywords: Nernst distribution law, Distribution coefficient, Partition coefficient.

INTRODUCTION

Our concern is, is there any distribution or partition law of a solute between two solvents which are completely ***miscible***? If so can it be determined? We have taken benzoic acid (BA) as an example. From the scheme 1 below



Scheme 1

17-18 (4)

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Conventional and Microwave Assisted Synthesis of Quinoxaline Carboxamide Derivatives

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The synthesis of carboxamide derivatives containing quinoxaline scaffold is described. They were prepared from 3-hydroxy quinoxaline-2-carbohydrazide in a series of steps using conventional as well as microwave assisted methods.

Keywords: Carboxamide derivatives, Quinoxaline, Microwave assisted synthesis.

INTRODUCTION

The versatility of the quinoxalines, in addition to its chemical simplicity and accessibility, makes them the most promising sources of bioactive heterocycles.The quinoxaline skeleton is used as an intermediate in designing novel quinoxaline derivatives with potential as anticancer [1-3], antiviral [4], antimicrobial (or antifungal) [3], anticandida [5,6], antithrombotic [7], anxiolytic agents and other activities. Moreover, quinoxaline based drugs have shown to be photochemical DNA cleaving agents making them highly promising scaffolds for anticancer therapeutics.

Especially tetracyclic quinoxaline carboxamides showed cytotoxic activity which is helpful in treating cancers. Cisplatin is a platinum containing anticancer drug, used to treat various types of cancers, including sarcomas, some carcinomas, bladder cancer, lymphomas and cervical cancer. The synthesis of new platinum compounds using quinoxaline-2-carboxamide as a ligand would reveal the significance of quinoxaline derivatives [8]. They show cytotoxic activity, though displaying poor activity, compared to cisplatin [9]. Quinoxaline 2-carboxamides are efficient 5-HT_3 receptor antagonists, which reduce the side effects of cancer treatment like nausea and vomiting [10].

High blood pressure is the main cause of sudden cardiac arrest. Some of the quinoxaline derivatives are antagonists of bradykinin, which is a peptide responsible for the dilatation of blood vessels, thus leading to the lowering of blood pressure [11].

It is found that microwave enhances the rate of chemical reaction, thereby reducing reaction time, improving yields, purity and suppressing the formation of side products. Considering the significance of microwave assisted synthesis, we planned to synthesize some of the quinoxaline compounds through microwave.

EXPERIMENTAL

Chemicals and solvents used were purchased either from Fluka or Merck. All the reagents were of analytical grade. Microwave assisted synthesis was carried out in BP090 Laboratory grade microwave oven. Thin-layer chromatography (TLC) was performed on E.Merck AL silica gel 60 F254 plates and visualized under UV light. IR spectra were recorded as KBr pellet with a Perkin-Elmer spectrum gx FTIR instrument and only diagnostic and/or intense peaks are reported. ^{1}H NMR spectra were recorded in DMSO-d_6 with a Varian Mercury plus 400 MHz instrument. All the chemical shifts were reported in δ (ppm) where TMS is used as an internal standard. The ^{1}H NMR chemical shifts and coupling constants were determined assuming first-order behaviour. Mass spectra were recorded with a PE Sciex model API 3000 instrument. All the reactions were carried out under argon atmosphere.

RESULTS AND DISCUSSION

All the quinoxaline derivatives were synthesized by both conventional and microwave-assisted synthetic methods. Synthesis of N-[3-chloro-2-(aryl)-4-oxoazetidin-1-yl]-3-hydroxy-quinoxaline-2-carboxamides were carried out according to **Scheme-I**. The condensation of 3-hydroxyquinoxaline-2-carbohydrazide (**2**) and aldehyde in ethanol was carried out under reflux conditions for 1 h. The yields ranging from 55 to 65 % when synthesized by conven-tional method. The yield

17-18-(6)

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Peristaltic Transport of a Micropolar Fluid with Nanoparticles in an Inclined Tube with Permeable Walls

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Abstract: The paper deals with the theoretical investigation of peristaltic transport of a micropolar fluid in an inclined tube with permeable walls. The closed form expressions for velocity, pressure drop, time averaged flux, frictional force and mechanical efficiency have been investigated under the assumptions of low Reynold's number and long wave length. Effects of different physical parameters like micropolar parameter, coupling number, inclination, Brownian motion parameter, thermophoresis parameter, local temperature Grashof number, local nano particle Grashof number, slip parameter on pressure rise, frictional force, mechanical efficiency, temperature profile, nano particle phenomena, heat transfer coefficient, mass transfer coefficient and streamline patterns have been studied. The computational results are presented in graphical form. The present study puts forward an important note that peristaltic transport of a micropolar fluid with nano particles can be considerably controlled by suitably adjusting the parameters of micropolar fluid like micropolar parameter, coupling number, and also the parameters of nano particle like Brownian motion parameter, thermophoresis parameter. The peristaltic transport can also be controlled by slip parameter and inclination.

Keywords: Peristalsis, Micropolar fluid, Nano particles, Brownian motion parameter, Thermophoresis parameter, Mechanical efficiency, Slip Effect.

I. INTRODUCTION

Peristalsis is a mechanism which is involved in transportation of fluids from one place to another due to contraction or expansion of a tube containing fluid. Peristalsis appears to be the major mechanism in many physiological systems and mechanical situations.

Several researchers have investigated peristalsis in both physiological and mechanical situations.[Fung & Yih, (1968), Shapiro et al.,(1969), Devi & Devanathan, (1975), Meijing et al.,(1993), Maruthi Prasad & Radhakrishnamacharya, (2009), Pincombe et al., (1999), Maruthi Prasad et. al.,(2015), Santhosh et al., (2015)].

Nicoll et al., (1946) suggested that peristalsis plays a vital role in circulation of blood. The effects of an endoscope on peristaltic flow of micropolar fluid was investigated by Hayat et al., (2008). The effect of peripheral layer on the peristaltic transport of a micropolar fluid was studied by Maruthi Prasad et al., (2009).

Nano fluid is a fluid containing nano meter sized particles known as nano particles. The nano particles in nano fluids are typically made of metals, carbides, or carbon nano tubes. Nano fluids possess special properties that make them potentially useful in several applications in heat transfer, including microelectronics, pharmaceutical processes, fuel cells and hybrid powered engines.

Choi, (1995), was the pioneer of study of nano fluid technology. Sohail Nadeem et al., (2014) studied Mathematical model for the peristaltic flow of nanofluid through eccentric tubes comprising porous medium. Peristaltic transport of a nano fluid in an inclined tube was studied by Maruthi Prasad et al., (2015). Maruthi Prasad et al., (2015) also studied the peristaltic transport of nanoparticles of micropolar fluid in an inclined tube with heat and mass transfer effect.

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Role of Taft Equation in Selecting the Site of Attack in the Reactions of Aliphatic Amines and Tl(III)

Volume 33, Number 5

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ABSTRACT:

In our earlier article [1], we had shown the application of Hammett equation of finding the site of attack. The application is based on the relative position of substituent on the aromatic ring from the center of the reaction. We had shown why we have to use σ_m value for σ_p and σ_p value for σ_m value, when we use Hammett's plot. In the present article we have demonstrated the use of the Taft equation for finding the site of attack. Here too, similar necessity arises. Often occasion arises in research, related to oxidation of aliphatic amines, where there is more than one site of attack, and we have to find the right one. One of the sites may be the N-H bond of the functional group; others being the α-C-H bond and the lone pair of electrons of the nitrogen atom. In such a circumstance, the Taft equation plays a deciding role in location of the site of attack. This equation is apparently simple but requires judicious application. It is in the fitness of this aspect, an attempt is made to make the application more understandable and student friendly. Also we feel that it should be essential part of Physical Organic Chemistry Graduate Curriculum.

KEYWORDS:
Amines; Oxidation; One Electron Oxidant and Two Electron Oxidant

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Introduction

The Hammett equation, which is based on the linear free energy relation, does not apply to the reactions of aliphatic compounds and ortho substituted benzene derivatives. This is because of interference of substituent by the reaction center. Also Hammett's σ values concern groups attached to an aromatic system engaged in resonance.

For aliphatic compounds, the Taft equation in simple form is described as $\log k = \log k_o + \sigma^* \rho^*$ where k = rate constant for a particular member of a reaction series, k_o = rate constant for the parent compound, r^* = polar reaction constant and σ^* is the polar substituent constant which is the measure of the electron attracting ability of the substituent. It is a purely inductive effect and transmits itself through the aliphatic

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Taft Equation - A Convenient Tool to Decide the Position of Attack in the Reactions of Aliphatic Amines and Thallium(iii)

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ABSTRACT

In our earlier article[1], we had shown the application of Hammett equation of finding the site of attack. The application is based on the relative position of substituent on the aromatic ring from the center of the reaction. We had shown why we have to use σ_m value for σ_p and σ_p value for σ_m value, when we use Hammett's plot. In the present article we have demonstrated the use of the Taft equation for finding the site of attack. Here too, similar necessity arises. Often occasion arises in research, related to oxidation of aliphatic amines, where there is more than one site of attack, and we have to find the right one. One of the sites may be the N-H bond of the functional group; others being the α-C-H bond and the lone pair of electrons of the nitrogen atom. In such a circumstance, the Taft equation plays a deciding role in location of the site of attack. This equation is apparently simple but requires judicious application. It is in the fitness of this aspect, an attempt is made to make the application more understandable and student friendly. Also we feel that it should be essential part of Physical Organic Chemistry Graduate Curriculum.

Keywords: Amines, Oxidation, One Electron Oxidant and Two Electron Oxidant.

INTRODUCTION

The Hammett equation, which is based on the linear free energy relation, does not apply to the reactions of aliphatic compounds and ortho substituted benzene derivatives. This is because of interference of substituent by the reaction center. Also Hammet's σ values concern groups attached to an aromatic system engaged in resonance.

For aliphatic compounds, the Taft equation in simple form is described as $\log k = \log k_o + \sigma^* \rho^*$ where k = rate constant for a particular member of a reaction series, k_o = rate constant for the parent

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RESEARCH ARTICLE

Estimation of Taft ρ* of Dissociation Equilibriums of Methanium Ions RCH_4^+ the Hydrocarbon Super Acids: A Chemical Education Practice in Physical-Organic Chemistry Class-Room

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Abstract: In continuation of our efforts on the study of 'attenuation effect' in aromatic and aliphatic systems prompted us to give another attempt to estimate the Taft ρ* value of the dissociation equilibriums ($RCH_4^+ \rightleftharpoons RCH_3 + H^+$) of the methanium ion ($CH_5^+$) and substituted methanium ions (RCH_4^+) based on the attenuation effect on the dissociation equilibriums of alkyl ammonium ions ($RNH_3^+ \rightleftharpoons RNH_2 + H^+$) with one, two, three, four, five and six atoms between the ionizable proton and the first carbon atom of the substituent.

Keywords: Taft reaction constant (ρ*), attenuation effect, methanium ions, super acids.

INTRODUCTION

A super acid is defined as an acid with acidity greater than that of the acidity of 100% pure sulfuric acid, where acidity is in modern definition is defined as the chemical potential of the proton in a given medium is higher than that in pure sulfuric acid [1]. The first super acid where perchloric acid could protonate aldehydes and ketones in non-aqueous solvent like acetic acid that was known is nearly a century ago [2]. Later, many super acids were prepared in the Olah laboratory [3] at the University of Southern California by protonating hydrocarbons using a magic acid, a mixture of antimony pentafluoride (SbF_5) and fluorosulfonic acid (FSO_3H) was found by one of Olah students R. H. Schlosberg who dissolved a paraffin candle in the above mentioned magic acid. Examination of this solution by ^{1}H-NMR showed the presence of the t-butyl cation [4] that had been formed by protonation and subsequent isomerization of the original paraffin hydrocarbon. Concluding that this magic acid could protonate alkanes, it was found that methane can also be protonated at 140°C and at 1 atm. pressure to form the CH_5^+ ion as an intermediate [3]. As the ammonium ion is derived from ammonia by protonation, in the same analogy the CH_5^+ cation is called methanium ion as it was produced by protonation of methane. According to Hammett acidity function the H_o of CH_5^+ would be less than that of the magic acid because the magic acid was used to produce CH_5^+ by protonation of methane (CH_4) by a magic acid which must be a stronger acid than CH_4. H_o for some concentrated acids are [5]: Fluoroantimonic acid: -31.3, Magic acid: -19.2, Carborane superacid: -18.0, Fluorosulfuric acid: -15.1, Triflic acid: -14.1, Chlorosulfuric Acid: -12.78, Sulfuric acid: -12.0. Therefore, it is not unreasonable to propose a H_o value for CH_5^+ as little less than the value of magic acid i.e. - 19.2. One can put an upper limit of -19.0. Formulating an equation similar to Taft Polar Linear Free Energy (TPLFER) relationship [6-9]:

$$\frac{H_o^R}{H_o^H} = \rho^*\sigma^* \qquad (1)$$

where H_o^R and H_o^H are the Hammett acidity functions of the substituted and un-substituted methananium ions. To obtain H_o^R values of substituted methananium ions one needs the value of Taft ρ* as required in equation 1. In continuation of our efforts on the study of

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Silver Bullet For The Computation Of Equivalent Weight Of Sodium Thiosulphate In The Reaction

$$2S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^-$$

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ABSTRACT

When we standardize sodium thiosulphate solution either by iodometry or by a iodimetry, we base our understanding on $2S_2O_3^{2-}+I_2 \rightarrow +S_4O_6^{2-}2I^-$.While addressing the freshmen students, especially during the pre-experimental lectures, we teach them the computation of equivalent weight of sodium thiosulfate (hypo); this necessitates the knowledge of the difference in oxidation state of sulphur atoms in the product (2.5) and the reactant side (2.0); the difference in oxidation state of sulphur atoms is 0.5. The overtly observable query which occurs to the students is, "Is the equivalent weight and molecular weight of sodium thiosulphate same or different?" If yes, then the change in the oxidation state apparently does not conform to the difference, 0.5. This article deals with this apparently simple but extremely perplexing question

Key word: Oxidation States, Molecular Weight, Sodium Thiosulphate.

INTRODUCTION

If one attempts to calculate the equivalent weight of hypo in the title reaction i.e. the reaction between sodium thiosulphate and iodine molecule, the conventional method involves the evaluation of the oxidation state of sulphur in the reactant and product sides; this in essence gives the change in the number of electron(s) in the reaction. Then finally, we divide the molecular weight of sodium thiosulphate by the change in the number of electrons.

DISCUSSION

Let us apply the conventional method for the computation of equivalent weight of sodium thiosulphate to the title reaction. The first step

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(14)

Effect of Frustrated Exchange Interactions and Spin-half Impurity on the Electronic Structure of Strongly Correlated $NiFe_2O_4$

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Spin-polarized density functional calculations, magnetization, and neutron diffraction measurements are carried out to investigate the magnetic exchange interactions and strong correlation effects in Yb substituted inverse spinel nickel ferrite. In the pristine form, the compound is found to be a mixed insulator under the Zaanen-Sawtazsky-Allen classification scheme as it features both charge transfer and Mott insulator mechanism. Estimation of magnetic exchange couplings reveals that both octahedral-octahedral and octahedral-tetrahedral spin-spin interactions are antiferromagnetic which is typical of a spin-frustrated triangular lattice. However, the latter is dominant compared to the former leading to a forced parallel alignment of the spins at the octahedral site which is in agreement with the results of neutron diffraction measurements. The substituent Yb is found to be settled in +3 charge state, as confirmed from the XPS measurements, to behave like a spin-half impurity carried by the localized $f_{z(x^2-y^2)}$ orbital. The impurity f spin significantly weakens the antiferromagnetic coupling with the spins at the tetrahedral site, which explains the experimental observation of fall in Curie temperature with Yb substitution.

I. INTRODUCTION

The cubic inverse spinel $NiFe_2O_4$ (NFO) has been extensively investigated in the context of nanomagnetism [1], spin-filtering [2, 3]. spintronics [4] and multiferroics [5]. In addition, it exhibits unusual electronic and magnetic properties when Fe^{3+}/Ni^{2+} ions are partially substituted by other transition metal (M) ions, rare earth (R) ions or ions of non-transition elements [6–11]. Collinear Néel type ferrimagnetic structure of $NiFe_2O_4$ yields to triangular Yafet-Kittel structure upon substantial Cr substitution at the Fe sites [6]. The octahedra containing Fe^{3+} ions in NFO, when partially substituted by rare-earth (R^{3+}), become non-centrosymmetric to make the compound ferroelectric. Experimentally it has been shown that, substituents like Sm^{3+} and Ho^{3+} induce magnetoelectric effect in NFO [8].

Significant changes in the electronic, magnetic and structural behavior of Ni-Zn ferrite upon diluting with several rare earth ions have been observed [9–11]. With substitution of 2% of Fe by R (= Yb, Er, Dy. Tb, Gd, Sm and Ce) in $Ni_{0.7}Zn_{0.3}Fe_2O_4$, while lattice has been reported to expand and resistivity has increased, both magnetization and Curie temperature have decreased [9–11]. Larger ionic radii of R^{3+} ions cause lattice expansion and the $4f$ elections are more localized than the itinerant $3d$ electrons and hence, the resistivity increases [9–11]. The reported value of Curie temperature (T_C) of $NiFe_2O_4$ is 853 K [7, 12]. A decrease in T_C upon the partial substitution of R^{3+} for Fe^{3+} in $NiFe_2O_4$ has been reported from our lab [7, 8]. In $Ni_2Fe_{1.925}R_{0.075}O_4$ compounds, the T_C decreases to 775 K, 812 K and 839 K respectively for Dy [7], Ho^{3+} and Sm^{3+} substitutions [8]. However there are no concrete mechanisms and evidence to explain the decrease in magnetization and Curie temperature, even though qualitatively it has been attributed to weaker R-Fe exchange coupling replacing the stronger Fe-Fe exchange coupling [12, 13].

In this paper, results from DFT calculations and experimental studies are presented and analyzed to explain the electronic and magnetic structures of Yb substituted NFO *viz.* $NiFe_{2-x}Yb_xO_4$ (x = 0, 0.05, 0.075). The reasons for choosing Yb were manifold: (a) Structural distortion is expected to be weak or negligible, since the radius of Yb^{3+} ion (0.86 Å) is smaller compared to those of the other rare earth ions. (b) Yb ion can stabilize in +2 and +3 charge states. (c) Yb^{3+} is magnetic and has lower spin moment compared to the other R^{3+} (R = Gd, Tb, Dy, Ho, Er, Tb) ions [12] and hence, large reduction in magnetization as well as Curie temperature. (d) Yb^{3+} is expected to provide a spin-half f impurity state. Therefore, it serves as a model system to study host (d spin)-impurity (f spin) magnetic interactions.

Experimentally, X-ray photoelectron spectroscopy (XPS), Raman spectroscopy and neutron diffraction (ND) measurements are performed and theoretically, spin-polarized band structure is calculated to explain the electronic structure of $NiFe_{2-x}Yb_xO_4$. In addition, various magnetic exchange couplings are estimated from the total energies of several possible magnetic configurations so that the spin-spin interactions in this compound can be better understood. Emphasis is given on the magnetic coupling of Yb and Fe spins and its

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EFFICIENT VEDIC SIGNED DIGIT DECIMAL ADDER

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ABSTRACT:
Decimal arithmetic is convenient for financial calculations and other database manipulations as compared to binary arithmetic. Research is still going on to have specialized decimal arithmetic hardware processing units to make these tasks more efficient in terms speed, power and hardware to supports these applications. In this paper, we propose a new approach to decimal addition that is simple in concept, appealing and efficient in terms of speed and hardware. The proposed decimal adder lises a signed 2's complement vinculum representation of the decimal numbers. The design although generates a dual carry, i.e. a positive and a negative carry, analysis of the adder has revealed a much lower probability of carry generation as compared to the conventional decimal adder allowing the possibility of parallel decimal addition. The proposed VBCD adder is tested up to 16-digit on vertex 6 FPGA platform and also on 180 nm Cadence digital Encounter Tools

Keywords: *BCD Adder, BCD Subtractor, Two's complement number system, Vinculum numbers*

1. INTRODUCTION:

Decimal Arithmetic plays a very vital role in many financial, business and commercial applications for which binary arithmetic is not suitable. Thus in such systems the decimal hardware eliminates the need of internal binary conversions. From the last decade lot of research is going on decimal arithmetic [18] [14]. The literature available mostly concentrates on conversion of Decimal to Binary and from Binary to Decimal Numbers with Encoding and Decoding schemes like commonly available weighted and un-weighted codes, ASCII and EBIDIC codes [7] [17]. In recent literature there is a growing interest for computing Decimal arithmetic using Vedic mathematics [2] [19]. Our studies show that Vedic mathematics is a promising and emerging field for decimal arithmetic. Survey shows that faster and efficient arithmetic circuits can be designed using Vedic mathematics [8].

In this paper we have proposed a new method for decimal addition and subtraction using two's complement number system and Vedic vinculum number representation. Our simulation results indicate that this approach is viable and efficient. The synthesis results show a good amount improvement in speed.

The outline of the paper is arranged as follows. In Section 2 Vedic Vinculum number representation is explained with suitable examples. In Section 3 existing BCD Adder/Subtractor is given. In Section 4 Proposed Single digit VBCD Adder. In Section 5 Extension of VBCD Adder to 64 bit is proposed. Synthesis results are discussed in Section 6 and Conclusion with Future scope is provided in Section 7.

2. BASIC BACKGROUND ON VEDIC VINCULUM NUMBER REPRESENTATION:

It is a well-known and accepted fact that in ancient India (Vedic era) Vedic civilizations were known for being skilled in geometry, algebra and computational mathematics [8]. Even complex mathematical concepts like irrational numbers, calculus etc. was known to exist. They were studied and compiled by a Hindu scholar and mathematician, [Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaj] during the early part of the 20th century [8] [2] [19].

In this paper we have made an attempt to use the vinculum number representation to solve the problem of BCD Addition and Subtraction.

2.1Vinculum Representation of Numbers

Vinculum number representation allows BCD digits to take values from -5 to 5. If a higher digit, say 7 occurs it has to be converted into $1\bar{3}$. This type of representation allows only smaller +ve and –ve digits and hence it significantly reduces the probability of carry generation as illustrated in the Section 6.

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A NOVEL APPROACH TO THE LEARNING OF VINCULUM NUMBERS IN TWO'S COMPLIMENT METHOD FOR BCD ARITHMETIC OPERATIONS

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ABSTRACT: This paper proposes a new approach of representing decimal number system using Vinculum number representation. Vinculum number system consists of numerals 0,1,2,3,4,5 same as decimal number system and 6,7,8 and 9 are represented using negative numbers less than or equal to 5. Therefore Vinculum number system consists a set of numbers as {0, 1, 2, 3, 4, 5, −4, −3, −2, −1}. Hence complexity of higher order numerals like 6,7,8 and 9 are converted into less complex numbers. Vinculum is the Vedic method of representing decimal number system. Decimal numbers are representing in Binary Coded Decimal numbers for getting compatibility with Computer systems. Similarly we have used 2's complement number system for representing Vinculum numbers. This helped in representing signed Vinculum numbers. A unique set of tuples are represented in Vinculum number system which are suitable for any decimal arithmetic operation.

Keywords: Decimal numbers, BCD numbers, Vinculum numbers

Introduction:

Decimal Arithmetic plays a very vital role in many Finance, Business and Commercial Applications for which binary arithmetic is not suitable. From the last decade lot of research is going on decimal arithmetic and Decimal Floating point number systems [4][5] . The literature available mostly concentrates on conversion of Decimal to Binary and from Binary to Decimal numbers with various Encoding and Decoding schemes like weighted, non-weighted, Excess 3 code, Gray code etc. [1] [2] [4][6]. In recent literature there is a growing interest for computing Decimal arithmetic using Vedic mathematics [13] .The studies show that Vedic mathematics is a promising and emerging field for decimal arithmetic systems.

In this paper we have proposed a new method for decimal addition and subtraction using two's complement number system and Vedic vinculum method. Two's complement approach is normally used in binary addition and subtraction. To our knowledge very little literature is available on BCD Addition and Subtraction using Vedic mathematics. We have tried to investigate the use of 2's complement number system to represent vinculum numbers to solve the problem of BCD Addition and subtraction. Our Analysis shows that this approach is viable and efficient. Theoretical analysis shows that the number of carry bits generated from one digit to other digit are very less when compare to conventional (decimal) number systems.

The outline of the paper is arranged as follows. In Section 2 Various forms of Binary number systems are presented. In Section 3 Decimal number system using vinculum method were explained and concepts of Vinculum numbers, its Algorithm with examples are discussed, in Section 4 and Conclusion with Future scope in Section 5.

2 Overview of Number systems:

All human beings are familiar with their regional languages but one number system is common which is nothing but Decimal number system. Computers does not understand the words and letters of various languages. All those are translated into numbers where computers talk and understand each other. Although we are comfortable with decimal number system a student or a mathematician must be aware of various number systems and their working principle and their conversions from one form to another in various aspects.

2.1 Digits:

Before numbers are converted from one number system to another, the digit of a number system must be understood. The first digit in any numbering system is always a zero. For example, a base 2 (binary) numbers contains 2 digits: 0 and 1, a base 8 (octal) numbers contains 8 digits: 0 through 7 , a base 10 (decimal) numbers contains 10 digits 0 through 9, a base 16(Hexa means six and decimal means 10) numbers contains 16 different digits:0 through 9 and 10 to 15 in decimal is represented as A,B,C,D,E and F.

Once the digits of a number system are understood, larger numbers are constructed by using positional notation. As in decimal the position to the left of the units position was the tens position, the position to the left of the tens position was the hundreds position and so forth. Here, the units position has a weight of 10^0, or 1; the tens position has a weight of 10^1, or 10; and the hundreds position has a weight of 10^2, or 100. The exponential powers of the positions are critical for

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LOW POWER TEST PATTERN GENERATION USING TEST-PER-SCAN TECHNIQUE FOR BIST IMPLEMENTATION

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ABSTRACT

This paper introduces the function of test cases with minimal power for Built-In-Self-Test (BIST) implementation. This method intends Test-Per-Scan (TPS) based test cases using Multiple Single Input Change (MSIC) architecture. Multiple SIC patterns are developed by using EX-OR operation of twisted ring counter and test design algorithms like Linear Feedback Shift Register (LFSR),Bit-Swapping LFSR (BSLFSR), and Cellular Automata (CA). These patterns are used to a diminish number of transitions in the test patterns that are generated. The preferred method uses Test-Per-Scan technique for generating Multiple SIC test patterns. TPS diminished the power consumption during test mode. The seed generator used in TPS is modified LFSR's i.e., BS-LFSR, Cellular Automata (CA). BS-LFSR is composed of with an LFSR with a multiplexer. In CA, it also presents a variation on a BIST technique, which is from a one-dimensional cellular automaton; the pseudo random bit generator is generated. The proposed Hybrid Cellular Automata (HCA) using the rules 90 and 150 to generate the pseudo random designs. Moreover, the CA implementations illustrates properties of data compression like LFSRs and that they exhibit locally and with topological consistency significant attributes for a VLSI design. In this proposed method, LFSR is replaced with BS-LFSR, and HCA. Simulation and synthesis outcome with ISCAS c432 benchmark determine that Multiple SiC can reduce the power consumption.

Index Terms: BIST, MSIC, LFSR, BSLFSR, CA, HCA, circuit under test, test-per-scan, single input change, test response analyzer, pseudo random generator.

1. INTRODUCTION

Built-In-Self-Test scheme can adequately minimize the more complex VLSI analysis problems, by generating test hardware into the Circuit-Under-Test (CUT). The Linear Feedback Shift Register (LFSR) is generally exploited as Test Pattern Generators (TPGs) and Test Response Analyzers (TRAs) in traditional BIST technique. Amainsnag of these techniques is that the pseudorandom test cases produced by the LFSR causes a notably huge switching activity in the CUT, which can lead to enormous power dissipation and also blow the circuit and reduce the product yield. The LFSR generally requires very lengthy pseudorandom patterns in order to attain the required fault coverage in BIST implementation.

A. History work on BIST

There are a number of contrives that are used to generate design necessary for testing CUT. It has been founded that power consumption is more in test mode comparatively with normal mode [12]. The main idea behind low power techniques is to minimize the power consumption in test mode. Different kinds of test generation methods are required to develops table Built-In Self-Test (BIST) techniques. The utmost familiar test pattern design generation is based on pseudorandom pattern generators (PRPGs). The simple hardware on-chip test generation can be developed by pseudorandom tests patterns. Therefore, there are two major forms of PRPGs which is derived. Generally, the linear feedback shift registers and 1- Dimensional (1-D) Linear Hybrid Cellular Automata (LHCA) are major forms of PRPGs.

In spite of few coincidences, the series of states is consistently distinct between the LHCA and the LFSR, the LHCA can generates far good randomized test patterns [21]. The CA-based test generators will be an option to traditional LFSR algorithms. Further to meliorated randomization attributes, novel pseudorandom test design algorithms also have benefit in that they can be implemented for only contiguous neighbor communication and the physical length of the pattern generator. These can be elevated or diminished by only summate or deducting the cells. However, the investigation of aliasing function is a secondary controllable job for the CA than LFSR. The architecture in [7], presents Seeded Autonomous Circular Shift Register (SACSR) producing Single-Input-Change (SIC) patterns of maximum unique vectors. One of the ways to minimize power consumption is by reducing the transitions between the consequent patterns. Many techniques are introduced to minimize the transitions. The architecture in [3] presents Bit Swapping LFSR which is unlike from conventional LFSR reduces 33% of the transitions. BIST technique should generate test sequences with shallow power and area overhead and high fault coverage.

The architecture in [8] the introduced method has to decrease scan input bit transitions along operations of scan shifting. The architectures in [9], [11], [13] introduced various new techniques for reducing switching activities and also area overhead. The architecture in [2] introduces a new technique for generating the test designs with only single bit change compared with the previous patterns and generated using the XOR of the counter output with LFSR. The architecture in [5] power is

COMPRESSOR BASED 8x8 BIT VEDIC MULTIPLIER USING REVERSIBLE LOGIC

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***Abstract*: Reversible logic gates became very important and computing paradigm having its applications in low power CMOS technologies and Quantum computing [5]. Reversible logics are used to reduce the depth of the circuits [6]. This paper introduces a new architecture of 4:2 Compressorbased Vedic 8x8 bit Multiplier using reversible logic and is compared with conventional multipliers using Reversible logic and it was observed that the parameters like Hardware Complexity, power and Delay are improved over other Reversible multipliers. The design is simulated, synthesized and power estimation was done using TSMC 180nm technology using Cadence Digital tools.**

Keywords: Reversible gates, Compressors, Vedic Multiplier, Low power

1. INTRODUCTION

Vedic Mathematics is a system of reasoning and mathematical working based on ancient Indian teachings called Veda[10]. It is fast, efficient and easy to learn and uses all arithmetic and algebraic operations which are accepted by worldwide. The origin of Vedic mathematics is from Vedas and to more specific Atharva Veda which deals with Engineering branches, Mathematics, sculpture, Medicine and all other sciences which are ruling today's world. Vedic mathematics, which simplifies arithmetic and algebraic operations, can be implemented both in decimal and binary number systems [10]. It is an ancient technique, which simplifies multiplication, division, complex numbers, squares, cubes, square roots and cube roots. Recurring decimals and auxiliary fractions can be handled by Vedic mathematics. This made possible to solve many Engineering applications, Signal processing Applications, DFT's, FFT's and many more.[12][13]. Vedic mathematics consists of 16 sutras (formulas) and 13 sub sutras. We used UrdhvaTiryagbhyam method for multiplication process.

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The paper is organized as below. In section I we discuss algorithm of vedic multiplier for an 8 bit multiplication. Section II deals with Reversible Logics, Section III deals with Compressors and its structures and Section IV deals with proposed Multiplier using Compressor and Reversible logics, Section V Results and comparisons and Section VI Conclusions in terms of its Speed and Power

1.1 Line Diagram for 8bit Vedic multiplier

Let us consider the multiplication of 2 binary numbers. Line diagram for the multiplication is shown as below:

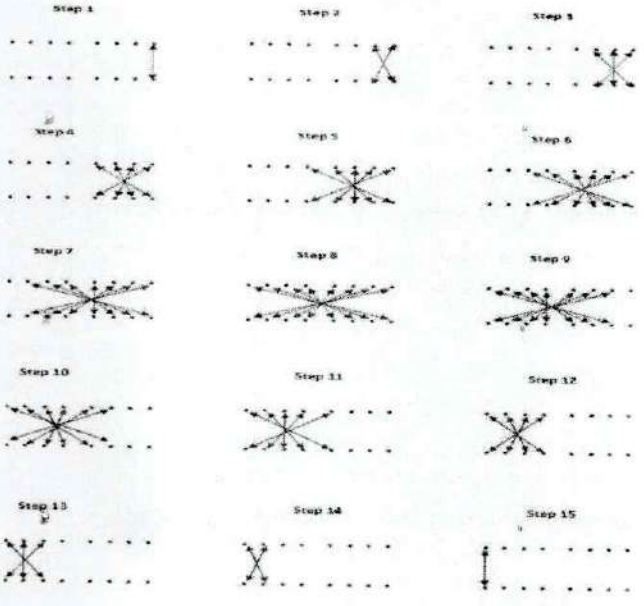

Fig 1: 8-bit Vedic Multiplier line diagram

Figure 1 explains how each bit is multiplied and final product is obtainedsimply by appending from step 1(LSB) to step 15(MSB).

DESIGN OF FUZZY LOGIC CONTROLLER OF RESIDENTIAL ELECTRIC WATER HEATERS

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ABSTRACT:
With the impending deregulation of electric utility industry, customer satisfaction with utility services will be crucial. Utilities will need to place a greater emphasis on their customer's preferences and desires. This paper describes a fuzzy logic-based control strategy for shifting the average power demand of residential electric water heaters from period of high demand for electricity to off-peak periods. A minimum temperature for hot water, defined as customer comfort level, is used as a control variable. Water temperature is not allowed to fall below the minimum temperature set by the customer. Simulation result show that the proposed strategy can shift the average power demand of residential water heater to improve the load factor of residential load profile.

Key words: Fuzzy Logic control, mat lab tool box, Electric water Heater.

I. Introduction:

An Englishman Benjamin Maugham, in 1868 invented the first instant water heater called "The Geyser", a device where the water was heated as it flowed into the bath. They were known to be quite dangerous.Maughn's invention influenced the designs of a Norwegian mechanical engineer by the name of Edwin Ruud, who immigrated to Pittsburg. Ruud who invented the electric water heater (automatic storage) in 1889, founded the Ruud Manufacturing Company, which is still in operation today, and pioneered the advancement of water heaters, in both the residential and commercial market.

Population growth along with technological growth force the utility companies to continue struggling to meet the ever-increasing need for electricity. With the majority of residents conforming to the 8 AM-5PM work schedule, the utility companies experience overwhelming demand peak associated with large amount of power being consumed at the same time. Complementing this effect are periods of low demand. Although over a period of time, the average amount of power consumed by community may be easily generated by a utility, that utility still has to provide enough generation to meet its highest power demand peak. It is in the best interest of the utility companies as well as the consumer to try to reduce these high peak demand periods and out their power demand profiles as much as possible.

One way this can be accomplished is by controlling residential electric water heaters. The Electric water heater accounts for the single largest contributor to the total power consumption of a residence. Existing electric water heater DSM (Demand-side management) strategies focus on on/off control of the water heater, where a group of heater are disabled during certain periods of time using a direct load control strategy [5].When water heater are energized, they are either on consuming a fixed amount of power , i.e.4.5kW,or they are off. the paper presents a fuzzy logic based variable power control strategy, where the power consumed by the water heater can be controlled based on the information available from the water heater such as water temperature, maximum and minimum water temperature allowed (or desired),and distribution level power demand. Based on the status of the above variables, the fuzzy controller will determine

NANO SCALED LIB/STATCOM FOR POWER QUALITY IMPROVEMENT IN A GRID INTERCONNECTED RES

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Abstract
The Renewable energy systems, particularly 'Wind Energy' development, showed its remarkable growth in the recent years, that can create pollution less and environment friendly atmosphere. The Nano Scaled Li-ion batteries are getting enormous attention as power sources and energy storage devices in Renewable energy system. Interconnecting the wind energy into the grid effects the power quality due to variable wind speed components. This paper shows the existence and mitigation of power quality problem due to installation of wind turbine with the grid i.e Harmonics. LIB plays critical role under clean energy system because it contribute for reduction of greenhouse gas emission. The performance of LIB is improved by developing high energy density electrode materials at Nano scale. A novel Nano Scaled LIB/STATCOM control scheme for grid connected wind Energy system has been developed using the MATLAB/SIMULINK to mitigate the power quality problems. In this the STATCOM is inputted by the Nano Scaled Li-Ion Battery Energy Storage system (LIB) it rapidly injects or absorbed reactive power to stabilize the grid system. Finally the results with LIB/ STATCOM, with STATCOM and without LIB and without LIB/STATCOM are compared and a mark reduction in total harmonic reduction is observed.

Keywords: LIB Li-ion battery energy storage; Nano Scale; PQ power quality; STATCOM;

I. INTRODUCTION

There is a current global need for clean and renewable energy sources where renewable energy sources can curb our need for fossil fuels. Fossil fuels are non-renewable and require finite resources, which are dwindling because of high cost and environmentally damaging retrieval techniques. So, the need for cheap and obtainable resources is greatly needed. The efficient and more feasible alternative option is solar, wind etc. Nano technology is the best tool for achieving breakthrough in Li-ion battery electrode material. In order to improve the performance of batteries it is desired to develop high energy density cathode materials using Nano materials. Now a day's Lead acid batteries have been used for solar electric systems but Li-ion offers higher energy density, longer cycle life, and no memory effect compared to lead acid batteries. [1]-[2]

A conventional STATCOM is a shunt-connected device which consists of a Voltage Source Inverter (VSI) and a dc capacitor. Since the dc capacitor is not a bulk energy storage device, the STATCOM does not have the ability of active power compensation. If an energy storage system, such as a Nano Scaled Li-ion battery, is connected to the dc capacitor, the power regulation ability of the STATCOM can be expanded to both reactive and active power compensation. The Active power control function can work faster than conventional synchronous generators and so, it has better performance. On the other hand, the reactive power control can enhance the power quality of

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ADAPTIVE NEURO FUZZY BASED MAXIMUM TORQUE CONTROL OF THREE PHASE INDUCTION MOTOR

Author Name(s): G.Srikanth, Dr.G.Madhusudhan Rao
Author Email:

Abstract

This paper manages the Maximum Torque Control of IM drives utilizing ANFIS. In modern control hypothesis, the IM is depicted by various arithmetical models, as per the engaged control technique. The proposed approaches straightforwardly direct the machine stator flux as indicated by the desirable torque, utilizing an optimal stator flux reference. In this manner, the proposed technique is appropriate for motor control conspires that depend on coordinate motion control, for example, coordinate torque control or direct torque vector control. Utilizing ANFIS, especially the neural systems, execution and operation of acceptance IM is progressed. This paper presents ANFIS based MTC of Three-phase IM. The execution of the intellectual controller has been examined through MATlab/Simulink condition, for various operational conditions. At last, the outcomes are watched that ANFIS based controllers give preferable reactions over alternate controllers

Introduction

For any machine we expect less error, most extreme output for that we have to control the torque. In three phases IM the maximum torque control can be accomplished in various techniques. The controlling of most extreme torque should be possible in customary controllers, for example, corresponding controller, relative in addition to essential controller however these are particularly helpful in steady state and for linear systems. In any case, the P, PI controller has primary disfavor is tuning of parameters Kp,Ki,Kd,Td,Ti (and also other problems like the high starting overshoot, sensitivity to controller gains and sluggish response due to sudden disturbance) In about the same period, there were also advances in control methods and Artificial Intelligence (AI) techniques.. Artificial Intelligent strategies mean utilization of master framework, fluffy rationale, neural systems and hereditary calculation. Experts soon understood that the control of IM drives can be improved by receiving automated interpretation based techniques like The Artificial Intelligence (AI) methods, for example, Expert System (ES), Fuzzy Logic (FL),

Novel Method for Loss Reduction and Voltage Profile Improvement with Multiple DGs

[1]Azra Zaineb, [2]J. Sridevi

Abstract— Distributed generation (DG) can be integrated into distribution systems to meet the increasing load demand. This paper discusses the sizing and sitting issue of DG placement in radial distribution systems using novel method. The main objective of the work is to minimize the active and reactive power loss and enhance voltage profile of overall system. This paper presents a methodology for optimal distributed generation (DG) location and sizing in distribution systems. The main objective of the added DG units is minimizing the total electrical network losses with acceptable voltage profile. The effectiveness of the novel method has been successfully tested on IEEE 33 bus radial distribution system in ETAP software and the results are found to be in very good agreement.

Index Terms— Voltage profile, real power losses, reactive power losses, radial distribution system, distributed generation,

1 Introduction

The electric utility system is usually divided into three subsystems which are generation, transmission, and distribution. The distribution system is commonly broken down into three components: distribution substation, distribution primary and secondary. At the substation level, the voltage is decreased and the power is distributed in smaller amounts to the customers. Consequently, one substation will supply many customers with power. Thus, the number of transmission lines in the distribution systems is many times that of the transmission systems. Furthermore, most customers are connected to only one of the three phases in the distribution system.

When you on the traditional power grid energy generation and distribution was relatively simple. The generator produced electricity at plant and the transmission system carried electricity from the plant to substations. At the substation, voltage was reduced and electricity continued to travel along the distribution system where transformers converted into voltage used by customer. At the customer site electricity passed through the meter which recorded usage as electricity was consumed. Energy flow was essentially one way. On a smart grid with distributed generation, energy can be generated close to the point of use and those who produce this power have the option to resell it to the utility [1],[2].

A generator is installed behind the metre to provide power. When this generator is not in operation power can be drawn from the grid. However, if there is an outage or when power prices peak, users can go off-grid and use a private generator to produce power. Solar, wind and thermal energy are renewable sources that can generate energy close to the point of use. Unlike major power stations, renewable energy resources can be installed in small increments and they have extremely low on-going costs. Though renewable energy resources are less predictable than the power generated by traditional means, hybrid systems can utilize both renewable and traditional power. With access to distributed generation resources within a smart grid, utilities can configure the existing systems to meet peak power needs and diversify the range of energy resources to increase the reliability of energy flow [3],[4]. For customers distributed generation supports

(i) Reduced energy costs

(ii)Reduced reliance on fossil fuels and

(iii) Increased use of renewable resources

Despite its relative unpredictability, renewable energy can fit with the load curve. For instance, in summer the sun produces high energy during the hardest part of the day when air conditioning is required, so solar energy is in affect converted into electric energy for cooling. Within the smart grid, integrated into the smart home and monitored by smart metering distributed generation is a new paradigm for energy distribution and use. For the first time energy flows to users as well as away from the users enabling utilities and their customers to work together to ensure that power is high quality, reliable, green and low cost.

Distribution systems hold a very significant position in the power system since it is the main point of link between bulk power and consumers. Effective planning of radial distribution network is required to meet the present growing domestic, industrial and commercial load day by day.

2 Load Flow Analysis

Consider a branch connected between buses 1 and 2 as shown in Fig. 1

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Directorate of Extramural Research and Intellectual Property Rights (ER&IPR)
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New Delhi – 110 011

26 Jul 2018

To

Principal
Geethanjali College of Engineering & Technology, Cheeryal (V)
Keesara (M), RR District, Telangana - 501301

Sub : **RELEASE OF 1st INSTALLMENT OF GRANTS-IN-AID FOR DRDO SPONSORED PROJECT TITLED** "Development of Novel Carbon Nanotube/polymer Nanocomposite Materials for EMI Applications".

1. Please refer our Sanction letter No ERIP/ER/1504754/M/01/1719 dated 2 Apr 2018.

2. An amount of **₹3039000/- (Rupees Thirty Lakh Thirty Nine Thousand only)** has been transferred to your account through **NEFT** mode towards the payment of **1st installment of the Grants-In-Aid**. Photo copy of cheque slip is enclosed herewith. **An official receipt of the payment may please be sent immediately for our records and confirmation.**

- **Interest earned from DRDO released funds must be included in the expenditure account & UC. The amount of intrest protion should be refunded through issuance of demand draft in favour of CDA (R&D), New Delhi. The release of further grant is subject to refund of intrest earned from previous release.**

- **Equipments funds amounting to ₹ 2252000/- have been sanctioned & released for 1st year duration to procure earmarked equipments (copy attached). It is adviesd to utilize the equipments grant in the 1st year duration for creation of asseats.**

- **Appointment of staff shall be as per rules and regulation of the grantee institution and selection proceeding, joining report and qualification of selected candidates be sent to this office. Govt regulation be followed, as applicable.**

The Project duration for the subject project is - 20.7.18 to 19.7.21

3. The grant shall be exclusively utilized for the purpose for which it was sanctioned. It may be ensured that expenditure should not be exceeded the limit of sanctioned amount under any head. **Expenditure over & above sanctioned level under any expenditure heads without prior approval of DRDO will have to be borne by the grantee institute.**

Contd.....

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(contd...)

UTILIZATION CERTIFICATE

FY 2018-2019 (From 20-7-2018 to 31-3-2019)

Certified that sum of Rs.30.39 lakh was sanctioned as grants-in-aid during the Year 2018-2019 in favour of Geethanjali College of Engineering and Technology. Instt) vide DRDO letter No. ERIP/ER/1504754/M/01/1719 dated 2-4-2018. A sum of Rs.30.39 lakh released vide Letter No. ERIP/ER/1504754/M/01/1719 dated 26-7-2018, an amount of Rs.44,794/- accrued as interest (if any) during the year and Nil on account of unspent balance of the previous year, a sum of Rs.16,23,988/- has been utilized for the purpose for which it was sanctioned and that the balance of Rs.14,59,806/- remaining unutilized at the end of the year will be adjusted toward the grants-in-aid payable during the next year i.e. 2019-20

Principal Investigator **Accounts/Finance Officer** **Administrative Authority (with official seal)**

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

2. Certified that I have satisfied myself that the conditions on which the grants- in-aid was sanctioned have been fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

For HARI BABU & ASSOCIATES
CHARTERED ACCOUNTANTS
Firm Regn. No. 001064S

(Ch. HARI BABU) Partner
M. No. 022361

Signature of Audit Authority of Grantee Institution

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Statement of Expenditure
(Period: 1st April 2018 to 31st March 2019)

Sr. No.	Sanctioned Heads	Total Funds Allocated (indicate sanctioned or revised)	Total Funds Released (Including interest)	Expenditure Incurred				Total Expenditure till 31st March 2019 VIII= IV+V+VI+VII	Balance as on (31st March 2019) IX= III – VIII
				1st Year (23rd Sep. 2015 to 31st March 2016)	2nd Year (1st April 2016 to 31st March 2017)	3rd Year 1st April 2017 to 31st Mar. 2018)	4th year (1st April 2018 to 31st Mar.2019)		
(I)	(II)		(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
1.	**Non-recurring (Capital Items)** Equipments [GNSS Receiver, Work Station and Printer]	**Rs.15,00,000/-**	**15,00,000/-**	Rs.7,48,860/-	Rs.7,48,859/-	-Nil-	-Nil-	Rs.14,97,719/-	-Nil- (Balance Rs.2,281/- returned to SERB DST)
2.	**Recurring Items (General)** General-A: (Consumables, Contingencies & Travel-domestic)	**Rs.3,50,000/-**	**3,38,605/- (*includes interest)**	Rs.40,679/-	Rs.36,962/-	Rs.78,672/-	Rs.1,83,051/-	Rs. 3,39,364/-	Rs.-759/-
	General-B: (Overhead Charges)	**Rs.3,00,000/-**	**3,00,000/-**	Rs.58,500/-	-Nil-	Rs.2,41,500/	-Nil-	Rs.3,00,000/-	-Nil-
	Total	**Rs.21,50,000/-**	**Rs. 21,38,605/-**	**Rs. 8,48,039/-**	**Rs.7,85,821/-**	**Rs.3,20,172/-**	**Rs.1,83,051/-**	**Rs.21,37,083/-**	**Rs.-759/-**

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(Dr. V. Satya Srinivas)
Signature of PI
Date: 29/4/2019

(Dr. S.Udaya Kumar)
Signature of Head of the Institute (with seal)
Date: 29/4/2019

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(B.Mallesham)
Accounts Officer of the Institute
Date: 29/4/2019

For CH. HARI BABU & ASSOCIATES
CHARTERED ACCOUNTANTS
Firm Regn. No. 012100S

(Ch. HARI BABU) Partner
M. No. 022301

Auditor
Date: 30/4/19

Annexure-III

UTILISATION CERTIFICATE

[FOR THE FINANCIAL YEAR - 2018-19 (1st April 2018 to 31st MARCH 2019)]

(Recurring head)

1. Title of the Project/ Scheme: "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" under start up grant for young scientist scheme.

2. Name of the Institution: Geethanjali College of Engineering and Technology (GCET)

3. Name of the Principal Investigator: Dr. V. Satya Srinivas

4. Science & Engineering Research Board (SERB)
Sanction order No & date sanctioning the project: SR/FTP/ES-156/2014, dt: 4th Sept. 2015
(First financial sanction order)

5. Head of account as given in the original sanction order: B. Recurring Items (General):
1. General A (Consumables, Contingencies, Travel-domestic).
2. General B (Overhead Charges).

6. Amount brought forward from the previous Financial year quoting SERB letter no and date in which the authority to carry forward the said amount was given : i. Amount: **Rs.28,733/-**
ii. Letter No.: SR/FTP/ES-156/2014
iii. Date: 4th Sept. 2015

7. Amount received during the financial year (Please give SERB Sanction order no and date) : i. Amount: **1,50,000/-**
ii. Order No: SR/FTP/ES-156/2014
iii. Date: 27th June 2018

8. Interest earned : **Rs.3,559/-**

9. Total amount that was available for expenditure (excluding commitments) during the financial year (Sr. No. 6+7+8) : **Rs.1,82,292/-**

9. Actual Expenditure (excluding commitments) Incurred during the financial year (upto 31st March) : **Rs.1,83,051/-**

10. Balance amount available at the end of the financial year: -Nil-

11. Unspent balance refunded, if any (please give details of cheque no etc.): -Nil-

12. Amount to be carried forward to the next financial year (if applicable): -Nil-

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

UTILISATION CERTIFICATE
(Recurring head)

Certified that out of **Rs.1,50,000/- (Rupees One Lakh Fifty Thousand)** of grants-in-aid sanctioned during the year **2018-19** in favour of Geethanjali College of Engg. & Tech., vide SERB order No. SR/FTP/ES-156/2014, dated: **27th September 2018** and **Rs.28,733/-** (**Rupees Twenty Eight Thousand Seven Hundred and Thirty Three**) on account of unspent balance of the previous year, **Rs.3,559/-** (**Rupees Five Hundred and Fifty Nine**) earned as interest during FY.2018-19, and out of total available balance of **Rs. 1,82,292/-** (**Rupees One Lakh Eighty Two Thousand Two Hundred and Ninety Two**), a sum of **Rs.1,83,051/-** (**Rupees One Lakh Eighty Three Thousand Fifty One**) has been utilised for the purpose of execution of the project entitled "Investigation of Linear Combinations of GNSS Measurements to Mitigate the Effect of Ionosphere and Multipath" for which it was sanctioned and that the balance of **Rs.-Nil-** (remaining unutilized at the end of the year will be adjusted towards the grants-in-aid payable during the next year i.e. 2019-20.

(Dr. V. Satya Srinivas) Signature of PI Date: 29/4/2019	(Dr. S.Udaya Kumar) Signature of Head of the Institute Date: 23/4/19	(B.Mallesham) Accounts Officer of the Institute Date:	Auditor Date: 30/4/19 UDIN No :- 19022361AAAAAD2782

Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(Countersigned in SERB)
Signature:
Designation:
Date:

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

No.GCET/ECE/R&D/SERB/2019 Date:11th June 2019

To,
Dr. Umesh Kumar Sharma
Scientist-E
Earth and Atmospheric Sciences,
Science and Engineering Research Board (SERB),
5&5A, Lower Ground floor,
Vasant Square Mall, Sector-B, Pocket-5,
Vasant Kunj, New Delhi - 110070

Sub:-Submission of Project completion report, statement of expenditure and fund utilization certificate – DST sponsored project entitled "Investigation of Linear Combinations of GNSS Data to Mitigate the Effect of Ionosphere and Multipath" - Reg.

Ref: DST Sanction Order No: SR/FTP/ES-156/2014, dt: 4th September 2015

Dear Sir,

This is with reference to the subject cited above. I herewith enclose the statement of expenditure and fund utilization certificates for the period **1st April 2018 to 31st March 2019** duly endorsed by the head of the institute along with five copies (05 No's) of Project completion report for your kind perusal.

Thanking you,

Sincerely,

Dr. V. Satya Srinivas
(Principal Investigator)

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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Speed Post

GCET/101/2019-2020, DT: 20-02-2020

सूक्ष्मतरंग नलिका अनुसंधान तथा विकास केन्द्र

बी.ई.एल. कांप्लेक्स,जालहल्ली, बेंगलूरु –560013

Microwave Tube Research and Development Centre

BEL Complex, Jalahalli, Bangalore-560013, Karnataka

EPABX: 28380388/28382402 **Fax**: 28381750/28386804/28386809 **e-mail: mmg@mtrdc.drdo.in**

रक्षा अनुसंधान तथा विकास संगठन,रक्षा मंत्रालय, भारत सरकार - Defence Research & Development Organization, Ministry of Defence, Government of India

संख्या/No. MTRDC/MMG/17111/LPO/134/18-19/BUP, **दिनांक/Date:** 13 **फरवरी/Feb.2020**

सेवा में/To,

M/s Geethanjali College of Engineering and Technology
Sy. No. 33 & 34, Cheeryal (V), Keesara (M),
Medchal District – 501 301 (Telangana)

विषय/SUBJECT: FORWARDING OF AMENDMENT-I TO CARS IN R/o "DESIGN AND SOLENOID MAGNET SYSTEMS FOR BACKWARD WAVE OSCILLATOR"

Reference: Our CARS contract of even No. dated 29.11.2018

1. Please find enclosed Amendment-I to CARS contract of even No. dated 29.11.2018 for the subject item.

2. Kindly, acknowledge on receipt.

एस. विजय महेंद्रा/S. VIJAY MAHENDRA
भंडार अधिकारी/STORES OFFICER
क्रते निदेशक/FOR DIRECTOR

To
Dr. R.S. Raju

9/2/20

Encl: a/a.

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY

Date: February 06, 2020

GCET ref. : GCET/MTRDC/2018
MTRDC ref.: MTRDC/MMG/1711/LPO/134/18-19/BUP/; CARS project titled "*design and development of solenoid magnet for BWO*"

Subject : Request for: (a) sanction of Rs 90,000 to procure equipment/materials to fabricate and test scale-down lab model of solenoid and (b) formation purchase committee to procure these items.

There is a provision in our MTRDC project to procure equipment and also materials necessary to build a lab model to validate our simulated results of solenoid magnet. The present costs of these items are:

1. Gauss meter with two Hall probes	Rs 20,000
2. Miscellaneous times: Multi-meter+Thermocouples+LC meter	Rs 10, 000
3. Insulate copper wire and aluminum frame and other materials	Rs 15,000
4. Power supply (50V/100A) to energize solenoid	Rs 45,000
Total	Rs 90,000

Principal is requested to approve advance of Rs 90,000 from college funds to procure the above items. The amount will be returned soon after the payment is received from MTRDC. It is informed that we spent only Rs 80,000 out of an allocated amount of Rs 1,90,000.

A purchase committee comprising of the following members may be approved to procure the above items.

i) Dr RS Raju, Dean, R&D and PI
ii) Mr B Mallesham, Accounts officer
iii) Dr Narasimhulu, Professor, ECE
iv) Mr Naresh Kumar, Asst. Professor, ECE

6/2/2020
(RS Raju)
Principal Investigator

Encl.: Copy of contract attached for immediate information.

Principal

as per Quotation approved
Pl pay cheque

Submitted to Secretary for approval.

06/02/20

Secretary

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

TEJA EDUCATIONAL SOCIETY(GCET)

Sub-Ledger DRDO Sponsored Project-MTRDC(CARS) 01-04-2018 To 31-03-2019

DRDO Sponsored Project-MTRDC(CARS)

Date	Voucher Number	Cheq. No R.no	Branc Amount Amount	Account	Debit	Credit	Balance	Narration
02-28-2019	Jrn:1062			Journal Entries Control A/C	31,000.00		31000.00Dr	Towards Staff Salaries payble for the Month of FEBRUARY'19
03-18-2019	Jrn:1240			S.V.Electronics Ltd	73,400.00		104400.00Dr	Twds.cost of DELL Vostro System & Printer (Brother) B:5789
03-30-2019	Jrn:1148			Journal Entries Control A/C	31,000.00		135400.00Dr	Towards Staff Salaries payble for the Month of MARCH'19
		Total (Rup			135,400.00			

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

GEETHANJALI COLLEGE OF ENGG. & TECH.
Accounts Officer

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

Project Title: **Alternate Energy using Stored Water**
(Inhouse project)

Service Provider : Mr Lolla Srinivasa Murthy
Bio Electrical and Energy Systems (BEES)
76 Prashant Nagar, Malakpet, Hyderabad – 500 036
Mobile: 98498-57173
E-mail <lolla@ieee.org>, <lsmurthy32@hotmail.com >

Principal Investigator: Dr. R.S. Raju

Objective : To design and develop alternate energy system using stored water.

Sanctioned amount : Rs 7.00 Lakhs

Project period : 1-1/2 years (starting 10-02-2018)

Work done : An alternate energy system has been developed to generate electrical power using stored water. The functionality of the system has been demonstrated. The project has been completed in January 2020; however, improvements are being made to enhance the efficiency.

Outcome : The functionality of system is demonstrated. This was aimed to generate electricity by passing part of the college water line through the system so that electricity is generated. The outgoing water will be used for wetting college lawns and plants.

Benefit to college : The design methodology is established which would be useful in developing a similar type of clean **energy systems** to the nearby villages for generating electricity as per their needs.

S.N.	Contents
01	MoU dated 06-02-2015
02	Scheme of implementation of project
03	Minutes of meetings
04	Completion certificate
05	Benefit to college
06	Financial statement

30/7/2021

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

A Two Step Copyright Protection Scheme for ColourImages

Dr .D. SrinivasaRao[1], Dr .Ch.Ramesh Babu[2], B.VenkateswaraRao[3]
Associate Professor, Dept. of IT, VNRVJIET, Hyderabad, India[1]
Professor, Dept. of CSE, GCET, Hyderabad, India [2]
Associate Professor, IT, IARE, Hyderabad[3]

Abstract: A two-step copyright protection technique proposed for color images by makes use of secret sharing and discrete wavelet transform (DWT) methods. The procedureincludes two steps: the share image generation step and the watermark retrieval step. Inthe generation step, the proposed method principally converts the host image into theYCbCrcolor interplanetary and yields a different specimen plane from the color space.Next, the procedure extracts the types from the sample plane by means of the discretewavelet transform. Previously, the procedure adventures the traits and the watermark to yield aprincipal share image. In the recovery stage, an extended watermark is initially reinstated bymeans of the sorts of the suspicious image and the principal share image. Succeeding, themethodology decreases the added noise to acquire the recuperated watermark, which is thenconfirmed in contradiction of the original watermark to observe the copyright. Retrievedwatermark image is assessed by image quality index(IQI), root mean square error(RMSE), peaksignal to noise ratio(PSNR), entropy, accuracy and proved that proposed methodology improvesaccuracy of the retrieved watermark image.

Keywords: *copyright, protection, watermark, discrete wavelet transform, secret sharing.*

I. INTRODUCTION

Visual cryptography based methodproposed for copyright protection in which watermark outline does not have to be entrenched into the source image unswervingly, which marks it tougher to notice or recuperates from the marked image in an illicit way. It can be recovered from the marked image without creating contrast with the source image. The legal representative also candown to pronounce the possession of the doubtful image by this technique. The watermark design can be any important black/white image that canbe castoff to characterise the possessor. Investigational outcomes demonstrated that the watermark design in the marked image has decentclearness and toughness [1].A vigorous copyright protection method for digital image is projectedin which thesecret image is registered to certified authority (CA) for addeddefence. In the stage of watermark drawing out, the watermark can be attained bythe stage exclusive-OR (XOR) process between the furtive image and the open image. The investigationaloutcomesillustrated that the projectedmethod not only can obviouslyconfirm the official document of the digital image, but also is strong to endurequite a lot of image processing attacks such asJPEGlossy compression, cropping, noise adding, sharpening and blurring attacks [2].

A copyright protection method ground on discrete cosine transforms (DCT) and secretsharing methods. The plannedmethod primarily makes use of the features of a host image, attained byapplying theDCT on the host image, to produce a master share. Then, the master share is exploited collectively with a binary watermarkto produce apossession share by utilizing the secret sharing method. To confirm the correct ownership ofthe host image, the concealed watermark can be exposedby means of the master and possession shares. Investigationaloutcomes exposed that the projectedmethod accomplishes acceptablesturdiness against numerousgeneral image processing attacks [3].

II. LITERATURE SURVEY

A new watermarking methodground on the shuffled singular value decomposition and the visual cryptography for copyright protection of images.It producesthe possession and recognition shares of the image ground on visual cryptography. It decomposes the host imageaddicted to low and high frequency sub-bands. The low frequency sub-band is additionallyseparated into blocks of same size after shuffling it and then the singular value decomposition is practiced to each arbitrarilycertain block. Shares are produced by correlating one of the essentials in the primary column of the left orthogonal matrix with its equivalentto constituents in the right orthogonal matrix of the singular value decomposition of the block of the low frequency sub-band. The investigationalproducts demonstrated that the plannedmethodevidently verifies the copyright of the host images, and is vigorous to survivenumerous image processing strikes. Assessment with the formerconnected visual cryptography-based methodsexhibits that the projectedtechniqueproduces improvedoutcome. The plannedscheme is particularlyplianttouching the regular attacks [4].A different strong invisible watermarking outline for embedding and extracting a digital watermark in a host image to defend its copyrights. The imperceptible enclosure of the watermark image into the original image is completed in wavelet domain using Haar wavelet transform. A mask matrix is produced by utilizing the original image with the aid of MD5 procedure and random matrix generation. The produced mask matrix is working in both inserting and miningpractices. The watermark is mined by calculating the associationdegrees amid the mask

AN EFFICIENT TREND DISCOVERY AND EVALUATING TECHNIQUE FOR TEXTUAL CONTENT MINING

Mrs. Mandadi Vasavi[1]
Assistant Professor,
Department of CSE,
RVR & JC College of Engineering, Guntur.

Dr. Kamakshaiah Kolli[2],
Associate Professor,
Department of CSE,
Geethanjali College of Engg. & Tech.,
Hyderabad.

ABSTRACT: *As a result of the quick expansion of virtual knowledge and building up the precise knowledge wishes of the customers, the information mining process has a very important position to extract the helpful knowledge from that enormous quantity of knowledge. The extraction of those knowledge can also be accomplished the use of other knowledge mining tactics. The primary purpose of doing trend mining is to enhance wisdom discovery fashions for the efficient make the most of found out trend and follow it in space of textual content mining. In knowledge mining group, so much analysis paintings center of attention on creating an efficient trend finding set of rules which come with method akin to sequential trend mining common merchandise mining and shut sequential mining for mining helpful styles. However there's a large problem to find and replace efficient trend. In efficient trend discovery and use tactics there are primary issues. Those are:*

- *Low frequency and*
- *Trend misinterpretation drawback*

The overall evaluation of a proposed device is designed to deal with the issues of low frequency and trend misinterpretation of trend discovery approach. The program attempts to unravel the prevailing method issues and examine the outcome generated by way of trend deployment and trend deployment wit trend co-prevalence strategies.

KEYWORDS: ***Knowledge Mining, Knowledge Retrieval, Trend Taxonomy Type, Textual content Mining, pattern co-occurrence matrix.***

I. INTRODUCTION:

Prior to now many years, a few vital knowledge tactics were proposed. Those tactics come with affiliation rule mining, common merchandise set mining, sequential trend mining, closed trend mining and most trend mining,. The use of the ones trend mining tactics isn't enough as a result of successfully the use of and updating a found out trend continues to be an unending analysis factor. The primary function of doing trend mining is to improve wisdom discovery fashions for the efficient make the most of found out trend and follow it in space of textual content mining.

In Knowledge Retrieval there are a few time period primarily based strategies. Those strategies have a just right statically homes, as it helps complex theories for time period weight. On the other hand time period primarily based strategies suffered through synonymy, polysemy and homo nym the place polysemy method or extra phrases has the similar that means; and synonymy one phrase has multiple that means. Through the years, word primarily based mining strategies speculation were proposed. Words may just raise extra semantics knowledge than time period as a result of that it's going to carry out upper than the time period primarily based strategies Even words are much less ambiguous and raise greater knowledge than person phrases, like phrases, word has its personal weak spot i.e low frequency. Like that of phrases primarily based strategies, styles revel in just right statistical assets and used as an efficient choice to words. For fixing the issues of word

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Research Article

Performance assessment of neuro fuzzy based image fusion of satellite images

Ch. Ramesh Babu[1*], D. Srinivasa Rao[2], T. Ravi[2] and G. Gopi[3]
Professor, Department of Computer Science, GCET, Hyderabad, India[1]
Associate Professor, Department of IT, VNRVJIET, Hyderabad, India[2]
Assistant Professor, Department of Computer Science, Akamai Tech, Hyderabad, India[3]

Abstract

Image fusion is a technique to converge multispectral (MS) and panchromatic (PAN) images in to a one fused image which is moderately supplementary helpful compared to input images taken for fusion. Image fusion is an important task to recover an image which delivers as much as evidence of the same body part at the similar time it also assistances to decrease the storing capability to a particular image. In this paper an assessment is completed among conventional image fusion methods; principal component analysis (PCA), discrete wavelet transform (DWT), IHS transform based fusion, Brovey transform based fusion, and the projected neuro fuzzy based iterative image fusion techniques. The proposed neuro fuzzy based iterative fusion method utilizes fuzzy inference system (FIS) prepared by determining fuzzy rules and membership functions precisely. Experimentations have been finished on different datasets of multimodal satellite images. The projected technique is perceivably and significant related with the other fusion approaches. For the assessment of the fused image obtained from various fusion techniques ten diverse measures is prepared and utilized of, namely image quality index (IQI) and mutual information measure (MIM) with probability density.

Keywords

Image fusion, PCA, DWT, IHS, Brovey transform.

1.Introduction

Functions (PDF) for inputs, root mean square error (RMSE), peak signal to noise ratio(PSNR), correlation coefficient (CC) and spatial frequency (SF). Assessment outcomes demonstrated that the projected neuro fuzzy based image fusion technique improved image quality than any of the conventional image fusion techniques. Image fusion to converge evidence from source images of a same section into a one combined image that is additional useful and is added appropriate for conception or computer handling domains. A structure is planned in which combines the welfares of a fuzzy validation and a neural structure. The framework seams collected Kalman unscrambling and subtle treating recommendation i.e. ANFIS to organization an operative evidence grouping approach for the objective subsequent outline. An original multipurpose intention motivated around ANFIS is projected to regulate rational developments and to deteriorate the uncertain exacerbation of approximation evidence from multisensory.

Fuzzy adaptable amalgamation scheming is a convincing device to make the genuine superiority of the excess covariance steady with its theoretical value. ANFIS designates excessive captivating in and projection abilities, which varieties it a creative device to achieve practiced susceptibilities in any outline. A neural organization is accessible, which can essence the assessable possessions of the models during the planning terms [1]. Image fusion method has been utilized in pronounced domains: medical image processing, satellite image processing, computer vision, involuntary change recognition, biometrics and armed solicitations. Multi-device image combination for investigation schemes deliberated where fuzzy method exploited for fusing images taken from various sensors, in order to improve conception for observation [2]. The source images decomposition by wavelet transform three consistency structures are mined and then a fuzzy instruction is utilized to combine wavelet factors from the two images conferring to the mined structures. Image fusion procedure built on fuzzy approach and wavelet transform, motivated on observable and electromagnetic image fusion and discourse a procedure centered on the DWT and fuzzy approach [3] and the method formed two fuzzy

*Author for correspondence

Study And Development Of Various Concrete Structures With Various Mixtures Ggbs, Fly Ash And Other Component Mixtures

[1*]D.Varun kumar, Assistant Professor, Geethanjali College of Engineering and Technology, Hyderabad.
[2]A.Kalyani,,Assistant Professor, Guru Nanak Institute of Technology, Hyderabad.
[3]P.Sharada, Assistant Professor, Mahatma Ghandhi Institute of Technology, Hyderabad.
Email Id: devvaru2@gmail.com , kalyaniakkala101@gmail.com , sharadharaop@gmail.com .

Abstract-There have been increasing efforts in recent years to minimize the amount of cement used in concrete. Efforts at partial replacement have been successful and regulations have been promulgated to standardize and use such formulations. Research aimed at complete replacement of cement by activating industrial materials that are rich in silica and alumina with alkaline solutions is still on-going all over the world. The present study was aimed at complete elimination of cement through the development of a geo polymer concrete containing the mixture of fly ash and ground granulated blast furnace slag (GGBS), activated by sodium based alkaline activators. The effect of replacing up to 50% fly ash by GGBS was considered. The strength parameters were studied for a mixture of sodium silicate and sodium hydroxide solution having concentration 12M. The samples were cured under ambient conditions as well as in an oven at 60oC for 24 hours. Compressive and split tensile strengths of the samples were measured on 3rd, 7th, 14th, 28th, 56th and 90th days of casting. The cubes were also tested for durability parameters by ponding in NaCl and H2SO4 solution for 28 and 90 days. It was observed that replacing fly ash with 30% of Sgave the best results.

Scope Of Work

This investigation is carried out to find the performance of concrete containing various supplementary cementitious materials like Alcco fine and ground granulated blast furnace slag (GGBS). Alcco fine and GGBS materials can be used in production of long lasting concrete composites. Concrete samples of M30 grade with the water/binder ratio 0.43, with various percent of GGBS (0%, 10%, 20%, 30% & 40%) were casted and optimum percentage is selected. GGBS optimum percentage is kept constant and replacement of cement is done with alcco fine at various percentages (8%, 10%, 12% & 14%) and tested for compressive strength at the age of 7, 14 and 28 days. The results were compared with conventional concrete.

In this paper, the effect of utilizing Fly ash (FA), Silica fume (SF), Ground granulated blast slag (GGBS), and various combinations of them is assessed. Their effect on the fresh stage and mechanical properties of Self-compacting Lightweight Concrete (SCCLWC) is investigated and compared to a control mix without Supplementary Cementitious Materials (SCMs). Flow ability, compressive strength, and flexural strength were the main criteria considered in the evaluation. Moreover, the applicability of the ACI 318 reduction factor (λ) for flexural strength was assessed for all mixes to capture the effect of various SCMs based on the lower and upper limits of the proposed ACI 318 equation. Results from the evaluation show that SF greatly improved the compressive strength and GGBS increased flexural strength of SCCLWC. However, SF reduces the flow ability of SCCLWC. Equally important, FA achieved the lowest increase in compressive strength compared to the control mix. Furthermore, the λ value of 0.85 proposed by ACI 318 for sand-lightweight provides a good estimate of LWC properties even when different SCMs are utilized. However, fly ash can affect the λ value at early age.

Objectives Of The Study

- To design optimum utilization of ggbs in fly ash based geo polymer concrete
- To study optimizing the use of fly ash in concrete
- To study the effect of ggbs and fine aggregate as self-cement nous material on fracture properties of self-compacting concrete
- To design an experimental investigation on strength parameters of fly ash based geo polymer concrete with ggbs

Literature Review

*Corresponding Author: D.Varun kumar,Email id: devvaru2@gmail.com
Article History: Received: Aug 15, 2018, Revised: Sep 10, 2018, Accepted: Oct 04, 2018

Study And Development Of Various Concrete Structures With Various Mixtures Ggbs, Fly Ash And Other Component Mixtures

[1*]D.Varun kumar, Assistant Professor, Geethanjali College of Engineering and Technology, Hyderabad.
[2]A.Kalyani, Assistant Professor, Guru Nanak Institute of Technology, Hyderabad.
[3]P.Sharada, Assistant Professor, Mahatma Ghandhi Institute of Technology, Hyderabad.
Email Id: devvaru2@gmail.com , kalyaniakkala101@gmail.com , sharadharaop@gmail.com .

Abstract-There have been increasing efforts in recent years to minimize the amount of cement used in concrete. Efforts at partial replacement have been successful and regulations have been promulgated to standardize and use such formulations. Research aimed at complete replacement of cement by activating industrial materials that are rich in silica and alumina with alkaline solutions is still on-going all over the world. The present study was aimed at complete elimination of cement through the development of a geo polymer concrete containing the mixture of fly ash and ground granulated blast furnace slag (GGBS), activated by sodium based alkaline activators. The effect of replacing up to 50% fly ash by GGBS was considered. The strength parameters were studied for a mixture of sodium silicate and sodium hydroxide solution having concentration 12M. The samples were cured under ambient conditions as well as in an oven at 60oC for 24 hours. Compressive and split tensile strengths of the samples were measured on 3rd, 7th, 14th, 28th, 56th and 90th days of casting. The cubes were also tested for durability parameters by ponding in NaCl and H2SO4 solution for 28 and 90 days. It was observed that replacing fly ash with 30% of 5gave the best results.

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- To study the effect of ggbs and fine aggregate as self-cement nous material on fracture properties of self-compacting concrete
- To design an experimental investigation on strength parameters of fly ash based geo polymer concrete with ggbs

Literature Review

*Corresponding Author: D.Varun kumar,Email id : devvaru2@gmail.com
Article History: Received: Aug 15, 2018, Revised: Sep 10, 2018, Accepted: Oct 04, 2018

Jour of Adv Research in Dynamical & Control Systems, Vol. 07, 13-Special Issue, 2018

Seismic Response of Indian Designed Five Storey Structure with World Earthquake Ground Motions

Ramachander Damera, Geethanjali College of Engineering and Technology, Civil Engineering Department, Hyderabad, India
Email Id: *ramachander66@gmail.com*
Purumani Supriya, Geethanjali College of Engineering and Technology, Civil Engineering Department, Hyderabad, India
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ABSTRACT. The According to Indian IS code, 1893:2002, Sixty percent of India's landmass is susceptible to earthquakes of moderate to high intensity. And total Indian land mass is divided into four zones viz., II, III, IV and V, where V being very severe. Currently, construction of RCC structures is not only limited to cities but has also seen growth in towns and villages. In this study, four similar five storey structures are designed to withstand lateral forces generated in four Indian seismic zones. And the seismic responses of these structures are tested with various earthquake ground motions recorded at different locations of the globe. Time history analysis is carried out, and comparisons of all the results are discussed in brief. All the three-dimensional numerical models are developed using ETABS.

Keywords: Seismic Analysis, IS Code 1893:2002, Time history analysis, Response Spectrum, ETABS

1. INTRODUCTION

An earthquake may be defined as release of elastic energy by sudden slip on a fault and resulting ground shaking and radiated caused by slip. Earthquakes are one of the worst among the natural disasters. About 1 lakh earthquakes of magnitude more than three hit the earth every year. According to a conservative estimate more than 15 million human lives have been lost and damage worth hundred billions of dollars has been inflicted in the recorded history due to these. Moreover, Indian-Subcontinent, particularly the north-eastern region, is one of the most earthquakes-prone regions of the world. The concept of earthquake magnitude was first developed by Richter [1], and hence, the term "Richter scale". The value of magnitude is obtained on the basis of recordings of earthquake ground motion on seismographs.

When earthquakes occur, a building undergoes dynamic motion. This is because the building is subjected to inertia forces that act in opposite direction to the acceleration of earthquake excitations. These inertia forces, called seismic loads, are usually dealt with by assuming forces external to the building. So apart from gravity loads, the structure will experience dominant lateral forces of considerable magnitude during earthquake shaking. It is essential to estimate and specify these lateral forces on the structure in order to design the structure to resist an earthquake.In practice, there are several different definitions of magnitude; each could give a slightly different value of the magnitude. Hence, magnitude is not a very precise number. Usually, earthquakes of magnitude greater than 5.0 cause strong enough ground motion to be potentially damaging to structures. Earthquakes of magnitude greater than 8.0 are often termed as great earthquakes. Intensity indicates the violence of shaking or the extent (or potential) of damage at a given location due to a particular earthquake. Thus, intensity caused by a given earthquake will be different at different places.

Earthquake codes are periodically revised and updated depending on the improvements in the representation of ground motions, soils and structures. Moreover, these revisions have been made more frequently in recent years. The Indian standard code (IS1893-2002) was also revised in 2001 and has been in effect since 2002 [2]. Based on this code book the seismic zones of India are revised as shown in figure-1.

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Effect of Twist Angle and RPM on the Natural Vibration of Composite Beams Made up of Hybrid Laminates

Rakesh Potluri, V. Diwakar, K. Venkatesh and R. Sravani

Abstract Rotating beams are crucial components that have a wide range of application in the aerospace and mechanical engineering fields. Some of the applications of the rotating composite beams include the helicopter blades, wind turbine blades, and propellers but rather than having a straight beam they are generally twisted which gives some added advantage to them. Having a good understanding of their behaviour, especially the natural frequencies of the structure, is crucial for designing a very good structure. In this paper, the effect of the pre-twist angle, rotation speed on the natural vibration behaviour of the rotating composite beams made up of a hybrid laminate was studied. A comparison between the natural frequencies and mode shapes of the composite beam with and without rotation and pre-twist effects was performed. The hybrid laminate was designed and properties of the laminate were found using the CLT theory, executed in the MATLAB software. Finite element analysis (FEA) was used for performing this work using the ANSYS Workbench software.

Keywords Rotating beams · Modal frequencies · Hybrid laminate · Twist angle · RPM (revolutions per Minute) · FEA (finite element analysis)

1 Introduction

In modern times, the metal beams used for the structural purpose are being replaced by the composite ones due to their inherent benefits offered by the composite materials. Rotating beams are usually found in applications such as wind turbines, turbomachinery, robotic sensors, and helicopter blades. Usually, the beams can be classified

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A Concise Review on processing of Hybrid Composites produced by the combination of glass and natural fibers

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Abstract

The application of natural fibers-based hybrid and pure composite materials is intensifying in the recent era. The driving factor behind this tendency is the amplified concern regarding the harm to the environment and the exhaustion of the natural resources, that is occurring due to the use of synthetic fiber-based composites. But, if the natural fiber composites are directly used for manufacturing, they can have potential challenges such as low mechanical properties, lower hygrothermal resistance…etc. In order to overcome those deficiencies, researchers are tending towards the development of natural fiber-based hybrid composites by hybridizing the natural fiber with the synthetic fibers. In this paper, a concise review was made on different methods through which hybrid composites can be manufactured. Advantages, disadvantages, and applications of those production techniques are also presented.

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Keywords: Natural fiber composites; Hybrid composites; Processing methods; Manufacturing; Glass fiber; Natural fibers;

1. Introduction

The gush in the anxiety of the people towards environmental sustainability has led the researchers and designers to develop new materials which are environmentally friendly. In this context, the integration of natural fibers for manufacturing composites is one of the ways of designing more eco-friendly materials. But, the main cons with

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A Concise Report on properties of Hybrid Composites manufactured from glass and natural fibers

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Abstract

The utilization of natural fibers as a potential reinforcement phase for manufacturing composite materials is on the rise due to the increased concern towards reducing the damage to the environment and to control the depletion of the natural resources. But, using the natural fiber composites directly can have potential challenges such as the low mechanical strength, low thermal stability, high degradation rate…etc. In order to improve those shortcomings, researchers are tending towards hybridizing the natural fiber composites with the glass fibers. In this paper, a concise review was done over the consequence of hybridization on the mechanical properties of the hybrid composites made from a mixture of both glass fibers and different natural fibers. From this review, it was concluded that hybrid composites with this particular combination have a great potential for property improvement and applications.

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Keywords: Hybrid composites; Glass fiber; Natural fiber composites; mechanical properties; Natural fibers;

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Influence of Elevated Temperatures on Flexural Strength of Polysialate Composite

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Abstract: Polysialate composites are a new class of high performance materials due to its excellent inherent high temperature resistance, low density and ease of manufacturing. These properties also suggest that polysialate composites have a high temperature resistance, environmental friendliness, light weight structures for both aerospace and motorsport applications. The foremost important requirements for these applications are a high temperature resistance, low density, good structural properties and ability to form complex geometries at low lead times. The polysialate matrix is based on polymineral resins, it allows manufacturing using conventional polymer composite lay-up, and also it allows for complex geometries to be fabricated. The most and widely used polysialate matrix materials are reinforced with silicon carbide fibres material will be used to study behavior of flexural strength over a representative temperature range. In addition to this, the results also provide the data required for the design of next generation high temperature structures. The three point bending test simulation analyses were performed according to ASTM standard on these polysialate composites. The simulation analysis results revealed that flexural strength of polysialate composites were stable over a representative temperature range 200OC to 600OC.

INTRODUCTION

Polymer matrix composites (PMCs) have traditionally been exploited to produce light weight structures. However they can only withstand maximum operating temperatures up to 300^{0}C. Ceramic matrix composite (CMC) materials are often used in higher temperature applications, as these can withstand elevated temperatures in excess of 1600^{0}C, although concerns still remain regarding their structural performance. The cost, and more specifically processing times, of CMC's can also be prohibitive when considering application in high temperature structures. There is, therefore, a need for materials which bridge this gap to aid in the development of high temperature structures.

Polysialates are ceramics derived from inorganic polymers and processed through a polymerisation chemical activation, rather than the extreme temperature processing synonymous with traditional engineering ceramics. This gives them a number of advantages over typical CMC materials such as low production times, environmental friendliness and low density. The materials used in this study were polysialate-type materials as matrix reinforced with silicon carbide fibre material.

Computational and Experimental Analysis Of $LiFePO_4/C$ Cathode Material For Lithium Ion Battery Applications

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Abstract. The present research work, First principles calculations have proven to be outstanding tools to laboratory experiments in research because they can calculate some characteristics of a modeled system that are very hard to obtain experimentally. First principles calculations (CASTUP) also offer far greater ability to control and manipulate a system, providing the modeled system reflects the real system accurately. calculations and their applications in the research of positive electrode materials were studied. An economical and novel method for synthesis of Nano porous $LiFePO_4/C$ composite by glycine and urea assisted combustion method with fuel to oxidizer ratio $\Psi = 1$.The average crystallite size of obtained $LiFePo_4$ /C composite from x- ray diffraction is 40-45nm. Morphological studies were done using scanning electron microscope the structure of the surface coated carbon and the material were investigated by Raman spectroscopy. The structure of the material at the molecular size scale has been investigated by FTIR transmittance and Thermal Analysis and stoichiometry analysis for Fuel to nitrate ratio for urea and glycine and for various molarities and there balancing equations and calculation for Enthalpy of combustion and adiabatic flame temperature results were present.

INTRODUCTION

In The future use of electrical energy dangles on the development and optimization of the next generation secondary ion batteries [1]. Batteries are incorporated in almost all portable electronic devices rely on energy stored chemically in them [2]. The key to achieving that objective may lie on Stoichiometric optimization and synthesizing the cathode material using chemical methods for battery applications.

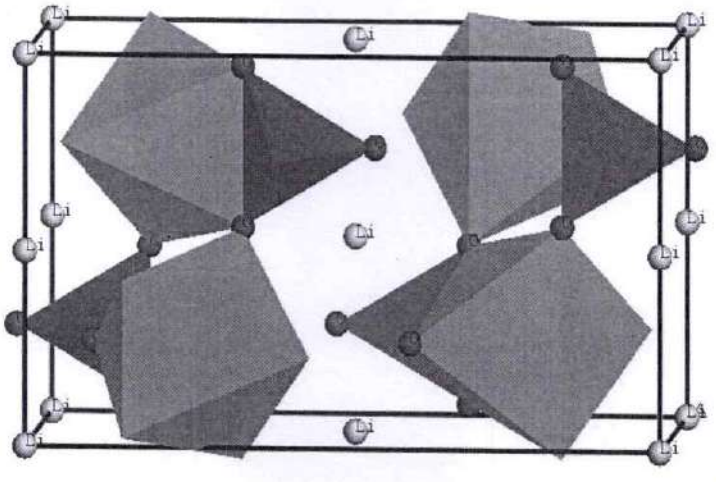

FIGURE.1 Crystal Structure of LiFePO4 Nanocomposite Material.

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Deep convolutional Neural Network in Smart Assistant for Blinds

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Abstract— **Increasing pollution and changing life styles has severely affected human health specially our sense organs. More exposure to screen has increased vision related problems even at very early age of life. The developing technologies should be utilized to help the persons with no or very less vision to lead an independent life in society. Computer vision is one such field that can be utilized to develop some cost effective products that can be very useful for these scenarios. The detection and recognition of text from natural image can be very useful for visually imparted persons as well as in various other applications like developing a smart system to help driver in getting voice signal for every road sign, and even warning if we did not follow the one. The proposed work uses deep convolutional neural network to implement a text detection and recognition system that is much simpler and faster as compare to traditional hand crafted feature based methods.**

Index Terms—Convolutional neural network, deep neural network,

I. Introduction

"VISION" is one of the most precious gift we have received from nature. But many among us could not receive this gift or lost this gift because of different reasons. Life of all these people becomes very difficult and they need to be dependent on others for each work. One of main reason for this is excessive exposure to screen. Many measures are already taken the government as well as non-government organizations to help such persons.

Artificial intelligence has lead to many smart devices that can help human in various fields of life. These technologies can also be utilize to help visually impaired persons. Deep convolutional neural network is one such technology that has made object detection face detection possible.

The computer vision is the key to develop various products that can help to provide artificial vision to various people. This artificial vision can be for face detection, object detection, text detection and recognition or the combination of all of these. The present work is a initial step for development of one such cost effective and easily portable or wearable device. The current project considers a scenario where a person suffering from a visual impairment needs a tool to carry around and receive a voice signal for the texts that are available around him. This will help in getting information from sign boards at various places.

Some products are available in the international market like one shown below but they are very costly (between 1500$ to 2000$):

1. Assisted Vision Smart Glasses: They are constructed using transparent OLED displays, two small cameras, a gyroscope, a compass, a GPS unit, and a headphone. Most visually impaired people can distinguish light and dark, these glasses can make anything that's close to the wearer brighter, so they can discern people and obstacles. The main problem with theses glasses is they are very costly and cannot identify text from images.

2. A wearable device called Horus is using combination of computer vision, machine learning and audio cues to improve the lives of visually impaired people. Developed by a Swiss startup called Eyra, Horus consists of a headband with stereo cameras on one end that can recognize text, faces and objects. Information from the cameras is fed via a 1m cable into a smartphone-sized box containing a battery and a NVIDIA Tegra K1 processor. This provides GPU-accelerated computer vision, deep learning and sensors that process, analyze and describe the images from the cameras.

Apart from this one more device, available in market is "figure reader". This MIT Media Labs project is a wearable device, a very chunky ring that sits on the finger and is capable of detecting and interpreting 12-point printed text as the user scans his or her finger across it. It reads aloud in real-time. Small vibrations alert the wearer to any deviation off the line. Seeing AI, an app developed by Microsoft AI & Research. It essentially narrates the world for blind and low-vision users, allowing them to use their smartphones to identify everything from an object or a color to a dollar bill.

But when the exact location of text is not known or the distance between the user and text is much more, these scanner based devices will not be much affective.

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Design and Analysis of Grading High Plate Type Spacer in a Single Phase Gas Insulated Busduct for Reduction of Electric Field Stress

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Abstract. Spacers are a key component of the gas-insulated structures. Most dielectric instances intensity collapses and ground flashover are attributed to distinguish the failures of spacer. Such Failures are due to non-uniformity distribution of electric field around the top of the spacer and high field tension at triple junctions. For a better electric field distribution, precise structure simulation of the spacers is important as it improves the component's existence. Rare pressure management results in problems such as moulding and manufacturing by shape modeling. In this paper, a graded high FGM insulating spacer is designed for a Single phase GIS for reduction of electric field stress. Stress in the electrical field for different values of high grading the FGM material is measured and the insertion of metal inserts is used to reduce the electrical field pressure.

INTRODUCTION

The severity of the electrical field distribution emerging it's growing within the GIS. The additional significance for analysis as the GIS becomes additionally lightweight. Out Of all the components inside GIS the electrical field stress formed on the surface insulating supporter connected between inner conductor and the outer conductor, influences the quality of GIS insulation. Strong field strains the spacer's surface, might lead to surface electric arc over an amount of your time. Junction shaped by the conductor, gas insulation and solidity dielectric at high voltage and ground conductor ends known as Triple Junction (TJ).This TJ is a different one, essential space wherever high force field stresses can lead to partial discharges. This might more result into surface electric arc on the spacer surface. Spacers are one amongst the essential elements in GIS liable dielectric breakdown of material strength and surface electric arc, injecting the necessity in the development of safe and reliable electric spacers for the cost-effectiveness of GIS. The field experiments were carried out on the spacer surface thought about in concert of the live in assessing the spacer output.

LITERATURE REVIEW

Perry, E.R [1] et al reviewed various insulator shapes such as sleek disk, furrowed disk and cone quality. It is seen that the cone type spacer has considerable potential. Dielectric corrosion can gradually reduce the power of the insulator. Misaki, T [2] et al thought-about a significant downside is the native field intensification on a cone-type spacer mounted all SF6-insulated flanges. The improved structure with the spacer's surface form and speaking to slightly modified position proved beneficial in increasing the intensification of native fields.

To date, several techniques have been applied to improve the insulation efficiency and the electrical strength of sensitive gas-insulated switchgears. Such methods, though, create a lot of sophisticated pure mathematics in the

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Field Stress Control of a Post Type Grading Low Insulating Spacer with Functionally Graded Material in a Gas Insulated Bus duct

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Abstract. High voltage electrical systems are plagued by certain problems, such as high stress delivery and damage to insulation, which are necessary to ensure efficient network service High pressure on the spacer surface in a gas-insulated bus duct is a major factor influencing the insulation strength , particularly at the conductor, insulator and gas contact point (called triple junction).Research studies of spacer shaping have been found to be effective in managing pressure distribution but difficult in real-time applications. In this paper, for the regulated field stress division on the spacer layer, dynamically graded post-type spacer materials with dissimilar low graded permittivity are planned. Electric field calculations for low graded materials are performed and a uniform distribution of stress along the spacer is achieved by correctly designed metal inserts integrated in GIS.

INTRODUCTION

As the GIS gets closer, the degree of electrical stress in the field that have been develop inside the GIS becomes extra important for learning. The electrical field pressure produced on the insulator surface acts as a buffer within the external enclosure for the inner conductor. Sometimes it may result in flash over time due to Strong field pressures on the spacer interface. The high voltage junction is created due to electrode, the gas and the solid insulator and the neutral enclosure ends of the support insulator called TJ.High electric field stresses at TJ can cause partial discharges to be initiated, so it is considered a critical area. This results in flashing of the surface along the spacer surface. Spacers are among the most critical key components of GIS. These are accountable for collapse of dielectric Power and memory surface, introducing the want for efficient GIS quality in the development of stable and flashover free spacers. Field One of the field studies along the spacer surface measurements when assessing the efficiency of the spacer. Few researchers examined the quality of different insulator shapes such as smooth disks, corrugated disks and a cone. It is seen that the cone type spacer has considerable potential. Contamination with the insulator weakens the dielectric stress. The main problem considered is the intensification of the field analysis on the surface of the spacer form spacer that is mounted in SF6-gas -insulated system between flanges.

The improved design with the spacer's surface form and slightly changed contact location was successful in reducing the intensification of the local field. In order to improve insulation performance and unwind the electrical field intensity various techniques have been applied in practical gas insulated switch gears [1-6]. A new technique functionally graded materials (FGM) based technique has been implemented in new years. It is suggested to improve the voltage breakdown of the solid insulators, while keeping the structure simple. It is proposed to improve the voltage breakdown of the solid insulators, while keeping the structure simple. Okubo Group suggested the use of

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Comparative Study of Maximum Torque Control by PI ANN of Induction Motor

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Abstract

A novel maximum torque per Ampere (MTPA) controller for the induction motor (IM) drives is presented. It is shown to be highly suited to applications that do not demand an extremely fast dynamic response, for example, electric vehicle drives. The proposed MTPA field oriented controller guarantees asymptotic torque (speed) tracking of smooth reference trajectories and maximizes the torque per Ampere ratio when the developed torque is constant or slow varying. An output ANN based feedback linearizing concept is employed for the design of torque and flux subsystems to compensate for the torque-dependent flux variations required to satisfy the MTPA condition. As a first step, a linear approximation of the IM magnetic system is considered. Then, based on a standard saturated IM model, the nonlinear MTPA relationship for the rotor flux are derived as a function of the desired torque, and a modified torque-flux controller for the saturated machine is developed. The static and dynamic flux reference calculation methods to achieve simultaneously an asymptotic field orientation, a torque-flux decoupling, and an MTPA optimization in a steady state, is proposed. The proposed ANN based MTPA control algorithm also demonstrates a decoupling of the torque (speed) and flux dynamics to ensure asymptotic torque tracking. In addition, a higher torque per Ampere ratio is achieved together with an improved efficiency of electromechanical energy conversion.

INTRODUCTION

During recent decades there has been a growing trend within many applications to replace the induction machine (IM) with a permanent magnet synchronous machine (PMSM) due to its higher efficiency, torque, and power density. However, the cost of a PMSM is significantly higher than that of the IM due to the use of rare-earth magnetic materials which have a very limited origin and their cost is continuously increasing. The tendency to reduce the use of expensive rare-earth magnets in industrial and electrical traction drives has driven a renewed interest for research into advanced design and control concepts for IM. Field-oriented vector control (FOC), advanced FOC, and direct torque control (DTC) of IMs have been established as a defacto industrial standard for high and medium dynamic performance applications. Vector controlled and DTC IM drives typically operate with constant flux magnitude even at low values of produced torque which results in a good dynamic performance. However, conversely, the machine efficiency and power factor can be low, especially for small torque values.

The IM torque is a product of the flux amplitude and the torque component of the stator current, providing a degree of freedom for reduction of the power conversion losses or for attaining other performance criteria. The optimization techniques typically reported in publications adjust the flux level as a function of the electromagnetic torque using various optimization procedures. The flux regulation restricts the drive's dynamic performance; hence, this approach can be employed in applications not requiring an extremely fast response, for example, in electric vehicle drives where the drive only operates at a rated torque for a limited proportion of time. A number of control strategies to optimize different performance objectives are known including minimization of active and total losses, power factor maximization, maximum torque per Ampere (MTPA) control, maximum torque per voltage control, and maximum power transfer. The established optimization methods are designed for a steady-state operation (i.e., the drive is operating in constant torque). Dynamic behavior optimization during torque transient is only considered in very few papers.

MTPA control minimizes the stator current for a given machine torque. Maximizing the machine torque by having limited source voltage and inverter current capability improves the electromechanical system performance. This is particularly beneficial for traction systems. Under the MTPA control strategy, the torque controller adjusts the flux reference to increase the efficiency at low loads. As a result of this optimization, the torque per Ampere ratio is maximized and, in addition, the achievable values of motor efficiency are close to those obtained using the minimum active losses optimization criterion. The basic MTPA control objective is achieved by controlling stator current torque and flux components, expressed in terms of rotor flux reference frame, to be equal. This leads to an IM operation with a constant slip frequency which is equal to the reciprocal of the rotor time constant. The MTPA relations are derived from the condition of the IM when producing constant electromagnetic torque. A few theoretical results based on vector and scalar control concepts are: modified field-orientated control nonholonomy approach, and voltage frequency control. However, simultaneous control of machine torque and flux results in poor torque dynamics; moreover, these dynamics cannot be specified due to the complexity and nonlinearity of the controlled plant (IM).

For all the optimization techniques above, an important issue for the variable flux operation is the machine saturation effect. This effect results in varying machine inductances; hence, the assumption of linear magnetic circuits, common for standard

Insulation Integrity of Grading High Insulating Spacer with Functionally Graded Material in a Gas Insulated Busduct

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Abstract. High voltage power equipment is becoming more compact and under high stress, resulting in loss of insulation. The construction of insulators plays a vital role in enhancing the system's reliability. For GIS, the solid supporting structures called spacers are vulnerable to increased stress and are concerned about their functionality. The point of contact of the conductor, gas and spacer called the triple point junction in the air-insulated bus duct is a highly stressed area and is responsible for significant insulation failures. GIS switchgear design requires comprehensive field distribution in the supporting structures called spacers, which is critical for the system's healthy operation. In this paper, high grade material is used for post form spacers with specific permittivity for controlling field stress distribution on the spacer surface. Electric field calculations for different grades are calculated and compared and the stress reduction is carried out with the insertion of metal inserts.

INTRODUCTION

Gas Insulated Busduct (GIB) is becoming the most popular technology in India due to its compactness, ideal use in restricted areas. The high demand for electrical power and energy efficiency in urban areas made it necessary for power consumers to boost the voltage network. Gas Insulated Busducts provides an excellent alternative to the above-mentioned issue and have been operating around the globe for over 30 years. The most challenges faced by the GIB is failure of Insulating spacers as they are the weakest insulating link (weak link) and they can lose their strength due to corona effect or metallic particles. The rapid rise in the power density of electrical equipment and electronic equipment highlights the need for thermally conductive but electrically insulating products. The surges or any event of flashovers will damage of spacer and hence a spacer material has to be chosen to get rid of these situations in regular testing in plant or onsite. It is enormously essential as SF6 systems should be viewed as self-restoration. Cycloaliphatic resins consist of greater track resistance when compared with biphenyl resins with reduced mechanical strength. Aluminum-based fillers along with epoxy resins are used to create general strength even though they have a demerit of greater allowability and greater thermal expansion coefficient. Due to the defects like protrusions, voids, depressions, cracks, delaminations and poor adherence to electrodes the life of the spacer can be decreased as the conductor is positioned in the middle of the spacer. From the survey of GIB used in the context of India it was observed that the maximum rate of its failures is because of material failures, improper selection of materials. Few other reasons like corrosion, loose particles effect the overall failures in the GIB.

This work focuses on design of Optimal Spacer in GIB using various insulating materials and analysis will be carried by determining electric breakdown strength, thermal conductivity, temperature resistance, corona resistance, and specific energy storage in dielectrics. Later, design of disc type and cone type FGM (Functionally Graded

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Additive Manufacturing for VADs and TAHs - a Review

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Abstract. Heart disease or Advanced/Congestive Heart Failure (CHF) is one of the serious causes of death. Due to availability of low volumes of donor hearts, there has been an ongoing development of Mechanical Circulatory Support (MCS): Ventricular Assist Devices (VADs) and total heart replacement by Total Artificial Hearts (TAHs) for over 60 years. MCS systems had seen three phases of advancement. The first generation were largely mechanical devices and had pulsatility in their action, but were highly cumbersome, unreliable due to fatigue cracks and required an external pneumatic power and control. Smaller and continuous flow devices are the second generation MCS devices. Because of compact sizing they were suitable for implantations and were more durable than the first generation devices. Problems like pump thrombosis drove the development of motors with levitating or hydrodynamic rotors, leading to the development of third generation devices. Manufacturing of these electromagnetic devices for implantation has to adhere to the constraints of compatibility, space and weight. With the advent of new biomaterials, additive manufacturing is reportedly playing a significant role. Additive manufacturing reported for electromagnetic and electronic components had yielded considerably good performance. This paper reviews materials in electrical and electronics and also in bio medical sector suitable for Additive Manufacturing. An attempt is made to identify the materials that may be suitable for VADs and TAHs and the challenges to use AM techniques that complement each other to create next generation integrated-VADs and integrated-TAHs.

1. Introduction

Due to the less availability of donor hearts [1], there has been an on-going development of Mechanical Circulatory Support (MCS) as VADs and as total heart replacements by TAHs for over 60 years as bridge to transplant or as a destination therapy [2-6]. Natural myocardial performance when replaced by MCS in pre-transplant patients was shown to improve post-transplant rates of mortality [7-9].

Mechanical circulatory frameworks had seen three phases of advancement. The first generation mechanical circulatory support devices were largely mechanical devices, which were highly cumbersome, unreliable due to small fatigue cracks and required an external pneumatic power and control. These devices had Pulsatility in blood flow. Smaller and continuous flow devices are the second generation MCS devices, which were electro-mechanical. They were more reliable and compact than the first generation. The lifetime was limited to 1-2 years, but failed to get pulsatility in flow. Diminished nature of pulsatility increased the pressure gradients on the aortic valve; left ventricular recovery rate got slower [10]. Problems like pump thrombosis prompted the development of non-bearing type of devices leading to the development of third generation devices, where the rotors/pumps magnetically/hydrodynamically levitate, thereby providing better hemocompatibility [11] . Manufacturing of these electromagnetic devices for implantation has to adhere to the constraints of space and weight apart from being bio-compatible. Researchers are trying to understand why the blood interacts with the artificial surfaces of the pumps to cause clotting and inflammation and thereby develop surfaces that avoid the same [13].

Longevity, hemocompatibility issues combined with predicted increasing demand for heart valve replacements has evoked the search for alternative fabrication methods of heart valve replacements [14],

Performance Analysis of Classical Controllers Tuned Using Heuristic Approaches for Frequency Regulation

Preeti Dahiya, Sandeep Dogra, Veena Sharma, Harish Pulluri, N. Gouthamkumar and U. Mohan Rao

Abstract This paper presents the performance analysis of classical controllers tuned using heuristic approaches for frequency regulation. The system under study comprises of two areas each having one thermal turbine in each control area. The frequency regulation is achieved using different classical controllers whose controller gains have been optimized using heuristic techniques namely genetic algorithm (GA) and gravitational search algorithm (GSA). To overcome the concerns of local trapping in local minima, hybridized GSA incorporating the concept of opposition learning and disruption, i.e., disrupted oppositional learned gravitational search algorithm (DOGSA) has also been used for optimization of controller gains.

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Synthesis And Charecterization Of $LiMn_{1.5}Ni_{0.5}O_4$ By Sol-Gel Method For Cathode Material & It's Application In Li-Ion Battery

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Abstract. Our past decade witness to the quick growth of Li-Ion battery industry in response to the growing needs of electronic and information industries. Lithium Cobalt Oxide used as Initial cathode material for Lithium batteries application it consist of high toxic nature, costly and with low energy density. Thus there need to develop new Li-Ion batteries to improve above characteristics along with efficiency and make it portable. So that can be used in electronics, transportation, and energy storage and especially in hybrid electric vehicles.$LiMn_{1.5}Ni_{0.5}O_4$ is hence the best development seen so far. It is improved version of $LiCoO_2$. It usually overcomes all the problem of older lithium batteries. The high initial capacity and good cycling behavior of $LiMn_{1.5}Ni_{0.5}O_4$ powders calculated at higher temperatures are closely related with the higher crystalinity and retention of the spinel structure with cycling and hence proved that $LiMn_{1.5}Ni_{0.5}O_4$ is far better than other batteries. For synthesizing $LiMn_{2-x}Ni_xO4$, we use sol-gel procedure. The electro chemical performances of prepared samples are tested. The crystalinity and lattice constants by X-Ray diffraction, thermal analysis by TGDTA, morphology by SEM and bonding between the atoms by FTIR were studied in this paper.

INTRODUCTION

In order to improve the efficiency energy density of LIBs, the cathode materials having either high reversible capacity or high operating voltage have been developed. Ni doped manganese spinel having operating voltage higher than (>4.6Vvs.Li/Li^+) that of conventional $LiMn_2O_4$ (4V) cathode material. The 4V manganese spinel suffers from structural degradation and John-Teller distortion, which is occurred due to Mn valance changes to Mn^{3+} in discharging period. This problem is overcome by the Ni doped Mn spinel $LiMn_{1.5}Ni_{0.5}O_4$ (LNMO), in which Mn valence relics 4^+, because Ni ion are active with electron redox reaction ($Ni^{4+}\leftrightarrow Ni^{2+}$). So LNMO is free from Jahn- Teller distortion and disproportionation reaction. Hence LNMO provides outstanding structural stability with high working voltage (>4.6Vvs.Li/Li^+) beneficial with respect to energy density and cycle life as a cathode for LIBs.

Partial replacement of Mn in $LiMn_2O_4$ with Ni is effective approach to improve the electrochemical properties of $LiMn_2O_4$ because the bonding energy of Ni-O is stronger than Mn-O. The stronger Ni-O bond is in favor of maintaining the spinel structure during cycling. This prevents the structural disintegration of materials. In case of Ni doping, the ionic radius of 0.64A°, which is nearly the same as that of Mn^{4+} (0.54A°) , so Ni can substitute for Mn in $LiMn_{1.5}Ni_{0.5}O_4$.The strong Ni-O bond is beneficial to improve electrochemical properties of $LiMn_2O_4$. Cation doping (like Ni) can improve conductivity, enlarge lattice constants and form stronger M-O bond, etc., which are favorable for the migration of lithium ions and maintaining stable crystal structure. Better electrochemical properties can be expected by choosing appropriate elements and amount. The advantage of $LiMn_{1.5}Ni_{0.5}O_4$ has better structural stability superior to the un -doped manganese spinel ($LiMn_2O_4$).

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Code-phase based combined GPS-Galileo positioning using Ionosphere-free linear combination

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Abstract

To reduce the uncertainty in location information supplied by GNSS receiver, the range errors (clock bias, troposphere, ionosphere, multipath etc.,) have to be eliminated. The linear combinations of multi-frequency GNSS observables, will aid in eliminating most of the errors. The ionospheric error is treated as predominant error and can be mitigated by using ionosphere-free linear combination. In this paper, the attainable accuracy using ionosphere-free linear combination of combined GPS L11/L5 and Galileo E1/E5a is evaluated for single point positioning. Taking the advantages of availability of civilian codes on signal frequencies, code-phase measurements are used instead of carrier-phase. The 95th percentile horizontal, vertical and 3D position accuracies are 1.08m, 0.80m and 1.81m respectively

1. Introduction

The reliability of GNSS range measurements are degraded due to systematic errors or biases and random noise as well. Therefore, pre-processing, processing, analysis and proper interpretation of measurement data is required for achieving optimal navigation solution. The issues addressed in pre-processing include cycle slip detection and repair, ambiguity resolution and code smoothing. The mitigation and modelling of biases and systematic errors in measurements comes under processing. Several algorithms using single, double and triple difference techniques are developed with various linear combinations of dual frequency data for static and kinematic applications. The common limitation among these techniques is that, they depend on the baseline distance between the pair of receivers involved for processing the data. Apart from differencing techniques, new observable can be derived from the basic GNSS observations of multi-frequency, such that new signals can be generated with various with unique properties capable of eliminating GNSS errors and this is achieved using linear combinations [1]. In the present study the ionosphere-free linear combination in position domain for dual system (GPS and Galileo) is investigated.

2. GNSS signal characteristics

The modernization of GPS and upcoming Galileo provide open services with new civilian codes on the following three radio frequencies L1/L2/L5 and E1/E5a/E5b respectively. The wavelengths of these signals are in between 19-25 cm. The frequencies of the signals are L1 L1(1575.42 MHz), L2 (1227.60MHz) and L5 (1176.45 MHz) and in case of Galileo E1(1575.42 MHz), E5a (1176.45 MHz), E5b (1207.14 MHz). These carrier frequencies are Bi-phase modulated in GPS and BOC modulated in Galileo system, by spread spectrum codes with a unique PRN sequence associated with each satellite vehicle (SV) and by the navigation data [2]. The dual mode GPS/Galileo with open service signals will enhance robustness of the navigation solution. Even in future, the dual frequency GBAS system can be deployed and get benefited from these new signals. Therefore, an attempt is made to evaluate the dual mode GPS/Galileo positioning using L1/L5 and E1/E5a signals.

3. Linear combinations

Developing various linear combinations of multi-frequency phase or code data, an optimal pseudo observation can be derived. The optimal combination will aid in elimination or mitigation of GNSS errors. Several linear combinations are proposed using GPS L1/L2 data. The various linear combinations are, narrow-lane, ionosphere-free, wide-lane, semi-wide-lane, and geometry-free combinations etc. The systematic errors eliminated using a specific linear combination can be found in open literature [3].

In particular, with ionosphere-free linear combination, most of the analysis carried out is mostly in measurement domain and not in position domain. The advantage of using linear model is that it can be directly in least squares adjustment to obtain position solution and eliminates using of a particular ionospheric model. Because, though Global, regional and local ionospheric models are being developed for supporting GNSS systems worldwide. The spatial and temporal resolution of these models is limited and major error still remains at times of high solar activity periods.

3.1 Ionosphere-free linear combination

This linear combination eliminates the effect of ionosphere. This is widely used in time and frequency transfer applications as well. The noise in the derived measurements is less. The possible ionosphere-free combinations using GPS frequencies can be found in open literature [3]. The ionosphere-free linear combination or

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Position Domain analysis of modernized GPS Ionosphere-free Code Observations

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Abstract

New signals (L2C and L5) are added as a part of GPS modernization to improve the achievable accuracy of the system. Compared to the legacy signals (L1/L2), new signals provide good cross-correlation performance, Forward Error Correction (FEC) and tracking facility. But the systematic errors in range measurements are the concern, particularly due to the ionospheric delay. The ionosphere-free linear combinations of dual frequency code or carrier phase measurements can be used to correct the refraction effects on GPS signals. The availability of L2C and L5 on Block-IIRM satellites has given an opportunity of direct comparison of coded signals instead of carrier-phase measurements. Simulation studies in the open literature on optimal linear combinations are focused in measurement domain. The analysis in respect of precision on coordinate parameters is essential to realize the optimal linear combination in position domain. Two ionosphere-free linear combinations L1/L5 and L2C/L5 of undifferenced/zero-differenced GPS coded signals are investigated for Single Point Positioning (SPP).

1. Introduction

Modernization of GPS is in progress by providing services through new civilian signals such as L5 and L2C along with Military codes on L1 and L2 signals. The L5 signal is the third civilian signal, after L1C/A and L2C. These three civilian signals can be used for Standard Positioning Services (SPS) by all the GNSS users worldwide for free of cost. Correcting for ionospheric error is a significant challenge to improve the positional accuracy. Either code-phase or carrier phase measurement on different frequencies can be combined to compensate for ionospheric delay. The undifferenced pseudorange/code-phase observables can be processed to obtain Single Point Position (SPP) solution.

Extensive research by Cocard and Geiger [1], Han and Rizos [2], Odjick [3] and Richert [4] outlines the criteria for optimal linear combinations using dual and triple frequency carrier phase measurements. However, the focus is into the measurement domain but not in the position domain. Also in case of triple frequency most of the research reported is based on simulated of signal measurements. In critical applications like Local Area Augmentation systems (LAAS) for category precision landing of aircrafts, code-phase measurements are processed for navigation solution. Therefore, in this paper the undifferenced dual and triple frequency ionosphere-free code-phase linear combinations in position domain are evaluated.

2. Modernized GPS Signals

The satellites from Block-I through Block-IIR transmits C/A-code on L1 frequency and P(Y) code on both L1 and L2 frequencies. However, the new generation of satellite vehicle Block-IIR-M (L2C) and Block-IIF (L5I and L5Q) are under deployment to transmit additional civil signals. In addition to this, for PPS an M-code signal on L1 and L2 frequencies is transmitted to overcome the legacy P(Y) code in terms of accuracy and security. The representation, L2C indicates civil signal on L2 carrier frequency. As the L2C signal belongs to Radio Navigation Satellite Services (RNSS) band, it is not appropriate for civil aviation. On the other hand, L1 and L5 can be used for safety of life applications, as these frequencies belong to Aeronautical Radio Navigation Service (ARNS) band. The L5 signal is the third civilian signal, after L1C/A and L2C. The Block III GPS satellites will have the fourth civilian signal L1C superimposed on L1 carrier in near future. This is a new civil signal that has backward compatibility with L1C/A.

3. GPS principle of operation

The GPS receivers track and acquire afore mentioned signals, and measure ranges to all the satellites in-view to estimate the user's position in 3-D (latitude, longitude and height). Let the user be at xu, yu and zu in earth fixed, earth centered coordinate system and the Satellite Vehicles (SVs) be at xi, yi and zi (where i=1,2,3,4) in the same coordinate system as the user. Fig. 1. depicts principle of operation. Assuming that the user starts his clock at tu seconds, receives signals at ti (i=1, 2, 3, 4) seconds from SV and Δt is the time offset between the user and SV. 3D position and time offset are obtained by simultaneously solving the nonlinear equations [5],

$$(x_u - x_i)^2 + (y_u - y_i)^2 + (z_u - z_i)^2 = c(t_i - t_u + \Delta t)^2 \quad (1)$$

A New Approach to the Construction of Transition Matrix with Application to Control Systems

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Abstract: In this paper the study of new approach to the construction of a transition matrix associated with first order matrix system of differential equations is applied in the control systems. This method is unique and is applicable to all problems that arise in control systems and the tedious calculations so far existing in literature will be condensed to less than half.

INTRODUCTION

In this paper we shall be concerned with the Existence and Uniqueness of solution to general first order Matrix differential equation

$$y' = Ay, \quad y(0) = y_0 \tag{1.1}$$

where A is an (nxn) constant matrix. It is a well known fact that the scalar exponential function e^{at} can be represented as a power series

$$e^{at} = 1 + at + \frac{(at)^2}{2!} + \cdots + \frac{(at)^n}{n!} + \cdots$$

Now, given an (nxn) constant matrix A, the corresponding Power Series

$$I + At + \frac{(At)^2}{2!} + \cdots + \frac{(At)^n}{n!} + \cdots$$

Converges entry wise to the Matrix exponential function e^{At}. The general solution of (1.1) can be written as

$$y(t) = e^{At}y_0$$

The paper is mainly concerned with computing e^{At}, and hence the solution of the initial value problem (1.1). Before presenting the general solution of the Initial value problem (1.1), we present the following two results.

Theorem 1.1: Let A be an (nxn) constant matrix with the characteristic polynomial.

$$C(\lambda) = \det(A - \lambda I) = \lambda^n + C_{n-1}\lambda^{n-1} + \cdots + C_1\lambda + C_0 ,$$

then $\phi(t) = e^{At}$ is the unique solution of the n^{th} order matrix differential equation.

$$x^{(n)} + C_{n-1}x^{(n-1)} + C_{n-2}x^{(n-2)} \ldots + C_1x' + C_0x = 0 \tag{1.2}$$

satisfying the initial conditions

$$\phi(0) = I,\ \phi'(0) = A, \phi''(0) = A^2, \ldots\ldots, \phi^{(n-1)}(0) = A^{n-1} \tag{1.3}$$

Proof: Suppose $x_1(t), x_2(t), \ldots\ldots, x_n(t)$ be n linearly independent solutions of the n^{th} order linear differential equation (1.2). Then it can easily be proved that ϕ satisfies the differential equations and ϕ satisfies the initial conditions

Therefore,

$$\phi(0) = I, \phi'(0) = A, \ldots\ldots\ldots\ldots, \phi^{(n-1)}(0) = A^{n-1}$$

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Mathematical Approach to Study Heat and Mass Transfer Effects in Transport Phenomena of a non-Newtonian Fluid

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Abstract: The paper deals with a theoretical investigation of the peristaltic transport of a couple-stress fluid with heat and mass transfer effects. The velocity, pressure drop, time averaged flux, frictional force, mechanical efficiency, temperature profile, nanoparticle phenomena, heat transfer coefficient and mass transfer coefficient of the fluid are investigated, when the Reynold's number is small and wave length is large by using appropriate analytical methods. Effects of different physical parameters like couple-stress fluid parameters, Brownian motion parameter, thermophoresis parameter, local temperature Grashof number as well as local nanoparticle Grashof number on pressure drop characteristics, frictional force, mechanical efficiency, heat transfer coefficient, mass transfer coefficient, steam line patterns and velocity profiles of the fluid are studied. The expressions for velocity, temperature profile, nanoparticle phenomenon, heat transfer coefficient and mass transfer coefficients are sketched through graphs in two as well as in three dimensional views. The streamlines are drawn to discuss trapping phenomenon for some physical quantities.

INTRODUCTION

Peristaltic transport is very important mechanism in the biological systems for the transport of bio fluids like blood, urine etc. It has numerous applications in physiological systems as well as in mechanical systems. The phenomenon of peristaltic transport is used in the manufacturing of nuclear reactors and also in roller and finger pumps.

Many investigators contributed to the study of peristaltic transport in mechanical as well as physiological situations. (Fung & Yih, (1968) , Shapiro et al., (1969), Pincombe et al.,(1999), Maruthi Prasad et al.,(2015)).

V. K. Stokes (1966) was the first person who developed the couple-stress fluid as a special case of non-Newtonian fluids. The important point in introducing the couple-stress fluid is to establish a size dependent effect that is not there in the viscous theories.

In 1986, L. M. Srivastava considered couple-stress fluids for his study and studied peristaltic transport in it. Maruthi Prasad & Radhakrishnamacharya (2009) considered a two fluid model with couple-stress fluid in the core region and Newtonian fluid in the peripheral region and studied the peristaltic transport. Rathoda et al., (2012) considered uniform and non-uniform annulus and investigated peristaltic motion of couple-stress fluid in the presence of porous medium. Maiti et al., (2012) done a theoretical investigation on peristaltic motion of a couple-stress fluid in a porous channel. The influence of Hall effect on peristaltic flow of a couple-stress fluid in a vertical asymmetric channel was examined by Kumar et al. (2017).

Nanofluid is the next exciting leading edge in technology. The applications of nanofluids are huge because of its enhanced thermal conductivity. Nanofluids used in Nano drug delivery, Cancer therapeutics, Nuclear reactors etc.

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A Mathematical Study on Two Layered Blood Flow of a Couple-Stress Fluid

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Abstract: A mathematical model is constructed to investigate the characteristics of a blood flow in two layered model. This model basically consists of two layers, in which couple-stress fluid with nanoparticles in the core region and Newtonian fluid in the peripheral region are considered and studied under the assumption of lubrication theory. The governing equations of the flow are solved and expressions for velocity in the core region and peripheral region, pressure drop, frictional force, heat transfer coefficient and mass transfer coefficients have been derived. The various effects of different parameters like couple-stress fluid parameters $\overline{\alpha}, \overline{\eta}$, viscosity ratio, mean radius of the central layer, local temperature Grashof number, local nanoparticles Grashof number, Brownian motion parameter and thermophoresis parameter on flow variables have been investigated. Trapped bolus and Streamline patterns are sketched through graphs at the end. The present model reveals that pressure drop and frictional force show the same behavior with respect to the various parameters.

Keywords: Peristalsis, couple-Stress Fluid, Nanoparticles, peripheral layer.

INTRODUCTION

Peristalsis is a very significant mechanism for fluid motion which is occurred by the dissemination of waves along the walls of a flexible tube containing fluid. Physiologically, it is an important and automatic process. This mechanism of peristaltic transport has been applied for industrial applications like transport of corrosive and noxious fluids, sanitary fluid transport and pumping of blood in heart lung machine. Several researchers have investigated this peristaltic transport of both Newtonian and non-Newtonian fluids in physiological and also in mechanical situations.

Stokes, (1966) was the pioneer to develop couple-stress fluid as a significant case of non-Newtonian fluids. A size dependent effect is introduced using couple stress which is not finding in the classical viscous theories. Noted researchers like Srivastava, (1986), Alemayehu & Radhakrishnamacharya, (2010), Maiti & Misra, (2012) and Shit & Roy, (2014) studied couple-stress fluid problems.

Addition of nanoparticles to the base fluids which are having less thermal conductivity enhances the thermal conductivity of the base fluids. Nanofluids have many biomedical and industrial applications. So many researchers

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Heat and Mass Transfer Effects of Power-Law Fluid in an Inclined Tube

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Abstract: The present investigation deals with the analytical study of heat and mass transfer effects of a Power-law fluid in an inclined tube. By adding nanoparticles to the power-law fluid, heat and mass transfer effects have been studied. Axial velocity, axial pressure gradient and frictional force are expressed analytically and the effects of various parameters on these flow variables have been studied. The present model revealed that heat and mass transfer coefficients decreases in the region [-1,0] and increases in the region [0,1] with the increase of Brownian motion parameter and shows opposite behavior with the increase of thermophoresis parameter.

Keywords: Power-Law fluid, Heat Transfer Effect, Mass Transfer Effect

INTRODUCTION

Peristalsis is a mechanism of fluid transport from lower pressure region to higher pressure region by contraction and expansion of a fluid along a tube like structure. This mechanism is very much important in human body. It has many applications in bio medical field as well as in industry. Many researches contributed their research on peristalsis. (Abd-Alla et al. (2014); Chandra & Pandey, (2018); Maiti & Misra, (2012); Noreen Sher Akbar, (2012); Srivastava, (1986); Yin & Fung, (1969)).

It is a known fact that in a homogenized blood, blood can be considered as power-law fluid, more so while flouring in large blood vessels. Though power-law model is popular, it does not show any prominent differences in stress. The viscosity is subject to the rate of shear. In case of shear thinning fluids, the zero shear rate viscosity increases whereas, in shear thickening fluids. Their velocities are zero as there shear rate increases. (El Naby & El Shamy, (2007); Hayat et al. (2006); Radhakrishnamacharya, (1982); Shukla & Gupta, (1982); L. Srivastava & Srivastava, (1988)).

Nanofluids are the fluids which contain nanometer sized particles. Nanofluids have many biomedical and industrial applications. Because nanoparticles increases the thermal conductivity of the base fluids with low thermal conductivity by immersing nanoparticles in the base fluids. Now a days void research is going on nanofluids. (Abbasi et al. (2015); Buongiorno, (2005); Ellahi, (2018); Narayanan & Rakesh, (2018); Noreen Sher Akbar, (2012); Prasad et al. (2017); S. U.S. Choi, (1995)). A very less research work has been done on power law fluid with nanoparticles.

By keeping all above in the mind, in the present paper heat and mass transfer effects of a power law fluid have been studied in an inclined tube using peristalsis. Axial velocity, axial pressure gradient and frictional force are expressed analytically and the effects of various parameters on these flow variables have been studied.

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HUMAN RESOURCE PLANNING THROUGH GOAL PROGRAMMING IN A SOFTWARE INDUSTRY

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Abstract: This paper presents the application of a Goal programming in planning the effective human resources in a software industry. A software industry comes across multiple objectives, tribulations, and tasks. These multiple objectives can be solved by goal programming. This GP model also conveys the idea of a strategic bidding in giving a quote for a new project. The various objectives and the constraints of the company are converted to prioritized goals and goal constraints in this model. Multiple (nine) category of employees and three differently skilled employees of the same category are also considered in this model and obtained the optimal solution to the GP model. Vogel's approximation and Modified-distribution methods are also used in solving the model problem along with the goal programming technique. This goal programming model provides effective HR planning, Budget and expenditure.

Key words: - Goal programming (GP), human resource planning (HR), Software industry, Product backlog Item (PBI), krona (SEK)

1 INTRODUCTION

Weak HR has been a major contributor to notable failures. Several articles, research papers and surveys brought to light about the demand for change in employee engagement, effective human resource planning for higher organizational performance. Sometimes, larger projects will take longer than necessary, or may never reach completion, because of the lack of necessary HR plan to break them down into more manageable segments. In general, most of the software companies depending on the past experiences or on the experienced employees in calculating the human resources, budget planning of the project, giving the quotation to acquire the project. For today's business practices to thrive the new technologies should be adopted or the old practices should be modified to meet the day to day challenges. Today, every organization requires HR strategies. Applying new ideas without knowing what exactly is it addressing will not generate a favorable outcome. A failed strategy will only guarantee wastage of time, money and effort. In today's business world finding the second chance is very thorny.

For example, a renowned industry like Toyota went into crisis and recalled its selling units thrice in recent years, but how could this happen to a renowned company which is known for its quality. HR management failures led to the problems which manifested themselves in manufacturing defects. The other human resources issue which led to this problem is the rewards system that is present at Toyota Motor Corporation. Another human resources issue that has led to its current problems is the failure to conduct proper risk management within the company; this is due to the lack of people assigned to this process. This example u[illegible]s the need of effective HR planning in the organizations.

The chief HR issues are lack of skilled employees, lack of proper human resource planning, poor salaries compared to its rivals and lack of control on the finance. Such expenses create financial burdens on the company which results in the downfall of the company. The solution to these kind of HR issues are proper human resource allocation, proper budget planning, inspecting employees performance, proper training to employees, reduction of work burden, recruiting skilled employees, proper wages and benefits to the employees. In this research paper, our research group is successful in giving the mathematical solutions to the HR issues for a model software industry through goal programming.

So many attempts are made by various research groups to trigger this issue in recent years. Lawrence Jones et al. [1982] have used GP model for allocating human resources for the good laboratory practice regulations. N. K. Kwak et al. [1997] have used GP Model for Human Resource Allocation in a Health-Care Organization. Glynn, Joseph. [2011] have used Goal Programming approach to human resource planning with a concentration on promotion policy. Nabendu Sen et al. [2013] have developed GP Model for Personnel Management in Tea Industry. Maliheh Khabiri [2015] has used GP approach for modeling human resource allocation to multiple projects. Mohammad Hossein Mehrolhassani et al. [2016] have used the GP to improve human resource allocation for urban family physician plan in Iran.

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Influence of Slip on Peristaltic Motion of a Nanofluid Prone to the Tube

K. Maruthi Prasad and N. Subadra

Abstract Influence of slip on peristaltic motion of a nanofluid prone to the tube is studied under the assumption of long wavelength and low Reynolds number. The equations governing the flow are solved and closed-form expressions for velocity, pressure drop, time-averaged flux and frictional force have been obtained. The effects of various parameters like Brownian motion parameter, thermophoresis parameter, local temperature Grashof number, local nanoparticles Grashof number, slip parameter and inclination on these flow variables have been studied. Streamline patterns and trapping phenomena have been studied and sketched through graphs at the end.

Keywords Nanofluid · Permeable walls · Brownian motion parameter Thermophoresis parameter · Local temperature Grashof number · Local nanoparticle Grashof number

1 Introduction

'Peristalsis is a mechanism of fluid transport that occurs widely in many physiological situations such as food mixing and chyme movement in the intestines, movement of ovum in the female fallopian tube, transport of urine through ureters'. Peristaltic motion of Newtonian fluids has been investigated by many researchers under various conditions [1–3].

Nanometer dimension materials show unique physical and chemical characteristics. Therefore, nanotechnology has a vast contribution in the industry. Nanofluids

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A Goal Programming Approach for an Effective Financial Budget of an Indian State

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Abstract

For a welfare country, the effective financial budget planning is always a challenging task. Though the goals of any financial budget are about the welfare of the country, yet the priorities may change from year to year, to fulfill the economic growth of the developing countries like India. In financial budgeting, the economical priorities of the democratic countries like India depend on the ethics or the promises given by the ruling political party. Besides that, the administrator has to consider various goals in obtaining a satisfactory solution to the financial budget. In this research paper, a State from India is considered and various goals were taken in to thoughtfulness. Multi-decision making problems can be solved by goal programming. The strength of the goal programming model is that it can solve multiple objectives simultaneously and can obtain an optimal solution that satisfies all the objectives and constraints. The objectfves change frequently. The goal programming model stated in this research paper can indicatively overcome the changes happening from time to time and can be successful in constructing the effective financial budget.

Keywords—*Goal programming, Goal priorities, Effective Financial budget, Indian state economy.*

1. Introduction

India is a developing country with mixed economy. India is the third largest economy by nominal gross domestic product (GDP) and ranks fourth in power purchasing parity (PPP). The country ranks 141st [12] in per capita GDP (nominal) with $1723[12] and 123rd[12] in per capita GDP (PPP) with $6,616[11]. After 1991 economic liberalization, India achieved 6%-7% [13] average GDP growth annually. In the fiscal year 2015 and 2017 India's economy became the world's fastest growing major economy surpassing China. India topped the World Bank's growth outlook for the first time in fiscal year 2015–16, during which the economy grew 7.6% [13]. Growth is expected to have declined slightly to 7.1%[13] for the 2016–17 fiscal year. According to the IMF, India's growth is expected to re-bounce to 7.2% [13] in the 2017–18 and 7.7%[13] in 2018–19 fiscal years.

In India, there are three types of sectors based on economy and GDP. They are **a.** Agriculture (primary sector) **b.** Industry (secondary sector) and **c.** Services (tertiary sector). In the agriculture sector, India holds world's second position in the agricultural production [13]. The agriculture contribution to the GDP is declining since from 1951, yet it is still the major sector of the Indian economy. Industry sector is having a steady share in the Indian economy and becoming the fastest growing e-commerce markets. In the service sector, India's contribution is increasing very rapidly from 2001. Information technology services (IT), business process out source (BPO) services and software services are the major exports of India in the service sectors.

Rapid increase in the contributions from the three sectors results in the growth of Indian economy. The development in Agriculture and allied services, industry and minerals, infrastructure, transportation, taking up of new irrigation projects, tourism, creating the farming jobs, providing health coverage, rural development, technical education, urban development, housing, water supply, sanitation, energy, labor and employment etc.. Leads to notable increase of Indian economy and per capita GDP. The development in the above said sectors can be achieved by the effective

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The Term, "Restriction" in Phase Rule Rendered More Intelligible: A Chemical Education Article for Undergraduate Students of Chemistry in India

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Abstract:

We have a mathematical relation for the determination of components (C), C = C' – rref.1 where C' is the total number of chemical constituents or species, and r is the number of restrictions or restrictive conditions, which is seldom used and taught in Indian Universities and colleges. In this article, we have made an attempt to elaborate the term restriction, taking few examples from one of the staple engineering textbook2 in India. Even though this equation C = C' – r appears simple, the meaning of the term r is difficult to comprehend. Therefore, we thought that elaboration of the term is of much use to both the teacher and to the taught. More importantly there appears some conceptual flaw in the calculation of components for particular reaction in this book2. And this flaw is reoccurring from the past 25 years. Our endeavor is to rectify this flaw in the interest of students, teachers and chemistry audience at large.

Keywords: Phase, Components, Restrictions Constituents and Phase rule.

INTRODUCTION

In phase rule, components3 (C) is equal to difference between the number of chemical species in the system and the number of equations relating the concentrations of these substances in an equilibrium system. This definition is especially useful in the case of constituents, which are capable of chemical interactions.

DISCUSSION

The meaning of the crucial sentence 'equations relating the concentration of these substances' in the foregoing paragraph is nothing but the restrictions imposed on the independent existence of the concentration of the substances. When the substances are related by equality, it overtly reflects that their freedom to exist

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A Facile Synthesis of N'-Arylidene-2-((7-bromo-2-methylpyrido[2,3-b]pyrazin-3 yl)oxy)acetohydrazides

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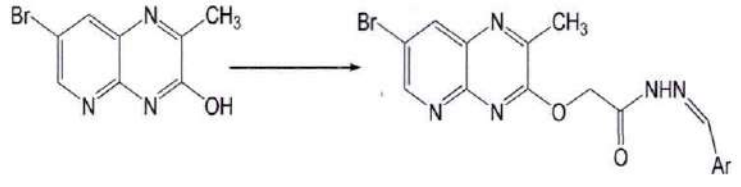
ABSTRACT

5-bromo 2,3-diamino pyridine and ethyl pyruvate react each other to form 7-bromo-2-methylpyrido[2,3-b]pyrazin-3-ol (1) which further reacts with ethyl chloroacetate and form ethyl 2-((7-bromo-2-methylpyrido[2,3-b]pyrazin-3-yl)oxy)acetate (2). Compound 2 on reaction with hydrazine hydrate gives 2-((7-bromo-2-methyl pyrido[2,3-b]pyrazin-3-yl)oxy)acetohydrazide (3), which on condensation with different aldehydes produce N'-Arylidene-2-((7-bromo-2-methyl pyrido[2,3-b]pyrazin-3-yl)oxy) acetohydrazides (4a-e).

GRAPHICAL ABSTRACT



A facile synthesis of N'-Arylidene-2-((7-bromo-2-methylpyrido[2,3-b]pyrazin-3-yl)oxy)acetohydrazides

Keywords: Heterocycles, Aldehydes, Antitumor agents, Hydrogen bond, Corrosion, Hormones

INTRODUCTION

Pyrido[2,3-b]pyrazine (5-azaquinoxaline) derivatives are very important nitrogen-containing heterocycles, that are extensively used for their pharmacological and therapeutic properties [1]. Pteridine and quinoxaline are structural analogues of them. Studies have shown that such compounds are widely involved in several fields, as they exhibit antimalarial, anti-cancer [2], antibacterial and anti-allergic activities [3]. They also exhibit antimitotic behavior [4]. Pyrido[2,3-b]pyrazine derivatives are well-known for their strong inhibitory activities of phosphodiesterase IV (PDE IV), the production of Tumor Necrosis Factor (TNF), Platelet derived growth receptor, gonadotropin releasing harmone, IgE production [5]. Pyrido pyrazine derivatives are broadly used as corrosion inhibitors for metals in acid environments, since they own the nitrogen and oxygen atoms which can easily be protonated to exhibit good inhibitory action on the corrosion of metals [6].

Mutations affecting Epidermal Growth Factor Receptor (EGFR) activity could result in cancers such as squamous-cell carcinoma of the lung, anal cancers, glioblastoma and epithelian tumors of the head and neck. The identification of EGFR as an oncogene (a gene that has the potential to cause cancer) has led to the development of anticancer therapeutics against EGFR, called "EGFR" inhibitors. Among them, using small molecule inhibitors to inhibit the EGFR tyrosine kinase is the most appropriate method, which acts on the cytoplasmic side of the receptor. Without kinase activity, EGFR is unable to activate itself, which is a prerequisite for binding of downstream adaptor proteins [7-9].

A Subclass of Meromorphic Functions Defined by Convolution

18-19 (7)

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ABSTRACT

In this paper we define a subclass $\sum_g(\alpha,\lambda)$ of Meromorphic univalent functions using convolution. We study some geometric properties of this subclass. In the first section of this chapter we discuss a coefficient characterization for a function of Σ_p to be a function of the class $\sum_g(\alpha,\lambda)$. we also discuss growth and distortion properties for functions of the class $\sum_g(\alpha,\lambda)$. In the second section of this chapter we find radii of starlikeness and convexity for the functions of the class $\sum_g(\alpha,\lambda)$. In the third section we find extreme points for the class $\sum_g(\alpha,\lambda)$.

IndexTerms - Meromorphic, Univalent, Convolution.

INTRODUCTION

Let Σ be the class of functions of the form $f(z)=\frac{1}{z}+\sum_{n=1}^{\infty}a_n z^n$ defined on the punctured unit disk $U^*=\{z\in\mathbb{C}: 0<|z|<1\}$.

Let Σ_p denote the class of meromorphic functions of the form

$f(z)=\frac{1}{z}+\sum_{n=1}^{\infty}a_n z^n,\ z\in U^*, a_n\geq 0$ for $n=1,2,3,....$ (1.1)

which are defined on the punctured unit disk $U^*=\{z\in\mathbb{C}: 0<|z|<1\}$.

If $f(z)=\frac{1}{z}+\sum_{n=1}^{\infty}a_n z^n$ and $g(z)=\frac{1}{z}+\sum_{n=1}^{\infty}b_n z^n$ are two functions in Σ, the Hadamard product or convolution of f and g is defined by

$$f(z)*g(z)=\frac{1}{z}+\sum_{n=1}^{\infty}a_n b_n z^n,\ z\in U^*.$$

Mogra et al [2] introduced meromorphic starlike functions of order α and type β, when the coefficients in Laurent series expansion about the origin are all positive and denoted by $\Sigma_P^*(\alpha,\beta)$. And obtained many useful results such as characterization of coefficients, distortion property, radius of convexity, extreme points for the class $\Sigma_p^*(\alpha,\beta)$.

Kavitha et al.[4] defined a new class of meromorphic functions

$$M_p(\alpha,\lambda)=\left\{f\in\Sigma_p: Re\left(\frac{zf'(z)}{(\lambda-1)f(z)+\lambda f'(z)}\right)\geq\alpha\right\} \text{ for } 0\leq\alpha<1,\ 0\leq\lambda<1, z\in U^*$$

and obtained coefficient inequality, growth and distortion bounds, radii of meromorphic starlikeness and meromorphic convexity for this class $M_p(\alpha,\lambda)$.

Definition [2] A function $f(z)\in\Sigma$ is called meromorphically starlike univalent of order α, $0\leq\alpha<1$ if and only if

$$-Re\left\{\frac{zf'(z)}{f(z)}\right\}>\alpha,\ z\in U^*.$$

Definition [2] A function $f(z)\in\Sigma$ is called meromorphically convex univalent of order α for $0\leq\alpha<1$ if and only if

$$-Re\left\{1+\frac{zf''(z)}{f'(z)}\right\}>\alpha,\ z\in U^*$$

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Tetrahedral Nature Determines the Stability of Reactive Intermediates: A Chemical Education Perspective

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ABSTRACT

Hammett equation is applied and the magnitude of substituent effect in terms of Hammett ρ has been estimated for the deprotonation equilibriums of highly unstable arenium ions (*Wheland intermediates*) $XC_6H_6^+ \rightleftharpoons XC_6H_5^+ H^+$ based on the attenuation effect of methylene group on the dissociation equilibriums of anilinium ions, benzyl ammonium ions and 2-phenylethyl ammonium ions. The Hammett ρ was found to be 14.3. The Hammett ρ for the deprotonation equilibriums of pyridinium ions $XC_5H_4NH^+ \rightleftharpoons XC_5H_4N^+H^+$ was estimated from the plot of log K_a vs Hammett σ, this value is 5.90. The magnitude of substituent effect in terms of Taft ρ* has been estimated for the deprotonation equilibriums of methanium ions $RCH_4^+ \rightleftharpoons RCH_3^+ H^+$ based on the attenuation effect of methylene group on the dissociation equilibriums of aliphatic amines and was found to be 6.9. The Taft ρ* for the deprotonation equilibriums of alkyl ammonium ions $RNH_3^+ \rightleftharpoons RNH_2 + H^+$ was estimated from the plot of log K_a vs Taft σ*, this value is 3.28. The large differences in the Hammett ρ of 8 units when carbon is replaced with nitrogen as heteroatom in the six-member aromatic ring and 3.6 units of Taft ρ* when carbon is replaced with nitrogen in aliphatic derivatives respectively is explained.

INTRODUCTION

The frequent over viewing and dealing with Hammett and Taft equations is a continuous well documented observation from our laboratory[1-16]. In all these studies application of Hammett and Taft equations is dealt in detail and even to physical properties like dipole moments, surface tensions and melting points of several organic compounds.

But application of Hammett and Taft equations to very unstable intermediates is a challenging task. Application of Hammett and Taft equations to arenium ions[10] (Wheland intermediates, $XC_6H_6^+$) and methanium ions[15] (super acids, RCH_4^+) is itself novel. In the present work we tried to explain why the deprotonation equilibriums of arenium ions (Wheland intermediates, $XC_6H_5^+$) and methanium ions (super acids, RCH_4^+) are more susceptible to substituent

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Application of dielectric mixtures formulae to $PbTiO_3$ based glass-ceramic systems

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on dynamics of L-alanine in water medium investigated by c relaxation spectroscopy

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ABSTRACT

The complex dielectric permittivity of L-alanine in aqueous medium at different concentrations and different temperatures were measured in the microwave ($0.02 < \nu/GHz < 20$) frequency region by using open-ended coaxial probe technique. From the reflection coefficient and impedance data, the real and imaginary part of the dielectric permittivity values is determined. It is observed that there is a decrease in the real part of the dielectric permittivity up to certain frequency and an increase in the imaginary part of the dielectric permittivity with increase in the molar concentration of L-alanine in water medium. Based on the experimental data the average relaxation time values are calculated and its behavior is analyzed in terms of bound water and free water molecules. The theoretical dipole moment of L-alanine is calculated at gaseous state as well as in aqueous medium by using PCM and IEFPCM model at HF, DFT/B3LYP and MP2 calculations using 6-311G* basis set. Analysis between experimentally determined parameters and computed dipole moments were discussed. The mean molecular polarizability is calculated from the Lippincott δ function potential model and compared with the Le Fèvre method of polarizability values.

on

of dielectric relaxation behavior of biological liquids is a importance because it provides valuable information on l dy nics of molecules. Most of the biological systems ydrogen bonds between molecules [1]. This hydrogen n important role in the various bio functional activities, actions, protein synthesis, drug designing, and electrical the material. Dielectric relaxation spectroscopy (DRS) so sensitive to detect changes in the molecular dynamics, ar bonding between the molecules and orientation of the nderstanding of intermolecular hydrogen bonding, typical havior of proteins solutions attracted many researchers for interest for recent and past [2–14]. The electromagnetic of basic amino acids in solution and its applications in mi– ilization as well as mechanism process explained by Chen 5]. Floros et al. [16] analyzed the lysozyme with molecular ulations in terms of the dielectric function and the results ned by the hydration shell decomposition approach. [17] interpreted the rotational spectra of two conformers gether with molecular orbital calculations using a larger basis set (6–311G**). Degtyarenko et al. [18] applied the Born-Oppenheimer molecular dynamics simulations of an L-alanine zwitterion solvated in water medium by considering the whole system relatively larger in size i.e. the L-alanine amino acid and 50 water molecules have been treated quantum mechanically.

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2. Experimental and computational details

The chemical sample used in this work such as L-alanine of analytical grade is procured from SRL Pvt. Ltd., Mumbai, India is taken in a different molar concentration levels (0.1 to 1 M) in double distilled water medium with respective maximum solubility. The complex dielectric permittivity ($\varepsilon^* = \varepsilon' - j\varepsilon''$) of these samples is measured in the microwave frequency range 20 MHz-20 GHz using the open-ended coaxial probe method [19,20] between 298 K–323 K. The high frequency dielectric permittivity (ε_∞) is measured by using Abbe refractometer. The dipole moment of the L-alanine molecule is calculated theoretically at gaseous state as well as in aqueous medium by using IEFPCM and PCM model at the DFT/B3LYP and MP2 using 6-311G* basis set using Gaussian software-03 [21–28]. The difference in energy between aqueous L-alanine and L-alanine (gaseous state) provides the information regarding the strength of the hydrogen bond interaction between L-alanine and water molecules and which is tabulated in the Table 1, respectively. The average dielectric relaxation time is determined from

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Statistical Modelling of GNSS Multipath Error Using Triple-Frequency Linear Combination

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Abstract

Multipath is considered as the major debilitating factor affecting the accuracy of global navigation satellite system (GNSS) and can lead to position error of 10 meters. Therefore, multipath characterization and modelling is indispensable. Now multipath error can be precisely estimated using triple frequency linear combination of GNSS signals. In this paper the triple frequency linear combination of code measurements of GPS (L1/L2C/L5) and Galileo (E1/E5a/E5b) signals are considered to precisely estimate the multipath and statistical model the error distribution. For multipath free environment the data with residual multipath error, does not follow any distribution.

1. Introduction

The shadowing of the signal from obstructions, foliage etc., and signal reflections due to terrain, buildings, vehicles etc., cause multipath error. The combination of multipath and shadowing is more detrimental in the context of multi-GNSS positioning. Multipath is considered as systematic as well as random error depending upon the type of application. The calibration of multipath remained as unsolved problem even after efforts by many investigators. Multipath introduces errors in both code phase and carrier phase measurements and subsequently in Position, Velocity and Time estimation. To reduce multipath effects various counter measures are deployed. These approaches include hardware (Multipath Estimating Delay Lock Loop (MEDLL) technique, Multiple Signal Classification (MUSIC) technique with multiple antennas etc.,), software (filtering techniques like RLS, MLS etc.,) and hybrid (combination of both hardware and software) [1]. Altogether, these methods have their own advantages and limitations and can be found in open literature [2]. The new receivers today available in market are capable of Tracking signals of multi-GNSS systems. Therefore, the receiver should be capable of processing the multi-frequency signals of these systems in complex environment, while adopting suitable models for various errors of GNSS link-budget. Further, in the development of software-based receiver and simulators for GNSS applications, the algorithms for multipath characterization for various environments will improve the commercial value of the receivers for various applications. Therefore, deep understanding of multipath characteristics is essential.

In the present study the linear combination of code measurements of GPS and Galileo signals are considered to precisely estimate the multipath at the station (GCET). As triple frequency approach found to be promising for precise estimation of multipath at a location, the three frequencies signals of GPS (L1/L2/L5) and Galileo (E1/E2/E5) are used. The following distributions namely Weibull, Gamma, Normal Beta and uniform ones are tested with the experimental data.

2. Multipath estimation: triple frequency linear combination

Direct and indirect signals received at the Global Positioning System (GPS) receiver have relative phase offsets and the phase differences, which are proportional to the differences of the path lengths. Multipath error can be estimated by using linear combinations of code and carrier phase measurements. The code phase and carrier phase multipath using triple frequency GPS measurements is given as [3],

$$M_{P_{125}} = \lambda_5^2(P1-P2)+\lambda_2^2(P5-P1)+\lambda_1^2(P2-P5) \quad (1)$$

$$M_{\phi_{125}} = \lambda_5^2(\phi 1-\phi 2)+\lambda_2^2(\phi 5-\phi 1)+\lambda_1^2(\phi 2-\phi 5) \quad (2)$$

Eq.(1) and (2), shows triple frequency linear model for multipath estimation from code and carier phase observations pertaining to three frequency signals respectively. The indexing of 1, 2, 5 in above equations corresponds to three frequencies, in case of GPS (U.S.A) L1 (1575.42 MHz), L2 (1227.60 MHz) and L5 (1176.54 MHz), for Galileo (Europe) E1 (1575.42 MHz), E5a (1176.45 MHz) and E5b (1207.14 MHz). $\lambda 1,2,5$ denotes wavelengths. This linear combination completely removes ionospheric error and other measurement errors as well and gives absolute estimate of multipath.

3. Distributions and statistical modelling

To characterize the behavior of a random variable PDFs can be used. Multipath effect is also random and thus can be described by using PDFs. In order to understand which

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Test pattern generation using thermometer code counter in TPC technique for BIST implementation

K. Jamal [a] ✉, K. Manjunatha Chari [a], P. Srihari [b]

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https://doi.org/10.1016/j.micpro.2019.102890

Abstract

This paper introduces a newly pattern generation with Test-Per-Clock technique for Built-In-Self-Test implementation. This proposed test vector generation generates Multiple Single Input Change vectors. Each pattern enforced in SIC vector as scan chain. To generate minimal transition sequence of test patterns, a scalable SIC counter and Thermometer Code Counter implemented. The proposed Multiple SIC vector generator is adaptable to both Test-Per-Scan, Test-Per-Clock techniques. This method developed a theory to evaluate MSIC scheme. Survey outcome demonstrates that, applying Multiple SIC test patterns on ISCAS C432 benchmark reduces the power consumption due to uniform distribution and lesser transition generated test patterns.

Previous Next

Keywords

Test-Per-Scan (TPS); Design under test (DUT); Multiple SIC (MSIC); Thermometer Code Counter (TCC); Test-Per-Clock (TPC)

International Journal of Recent Technology and Engineering (IJRTE)
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Electrical Drive System Modeling for Real-Time Digital Simulation Applications

G. Srikanth, G. Madhusudhana Rao

Abstract: In this paper the digital simulation of physical system in MATLAB-SIMULINK for real-time applications is simulated for partial-scale or full-scale and validated simulation results with the existing system. One of the applications is AC drive systems with speed adjustability not only limited to equipment's of electrical. The proper selection of AC motor drive is one of the main resolves of this paper. The efficient control of speed and torque is the second aim by considering the flux weakening regions.

Index Terms: Induction motor, Vector control, Flux-weakening region, Artificial Intelligent controllers.

I. INTRODUCTION

Depending upon the types of loads now days the growing demand is increased and the complexity also increased. The main objective and challenging is testing and verification of the loads and drive system. The realistic calculations and simulation studies are done with varying loads of mechanical. There are many learning and exhaustive algorithms of controllers to control the electric drives and control irrespective of the power specifications. Several experimental and laboratory experiments and tests are been conducted.

For high-power electric drives with all customized controllers for different applications by varying electric drive is designed and tested [1]. To use fully real-time digital simulation a recent alternative way of testing that is fast becoming is quite popular. Interfacing of these simulations with industrial controllers, thus saving a lot of cost of the investment amount and an economic tool is allowed for testing of drive controller in all power ranges and offering the machine simulations flexible [2].

"Online data and signal process for analysis purposes" of the use of virtual system drive systems enables relatively easier interface to the computer and faster and Earlier hardware which replaces the equivalent model of the drive system. The commonly used drive systems are induction motor, stepper motor, servomotor and synchronous motor and the same has been tested with different conventional and AI controllers, the hardware. Recently real time systems in fully digital simulation tested with regulator as well as experimental using a simulation [1] With the problem of modeling and real-time simulation, a converter starts and stops the drive for variable speeds and applications to develop models for electric vehicles and electric hybrids [3]. Proposal for the modeling of the drive system by block diagram representation and state space

Analysis, which is simulated in MATLAB, which is an easy to use software. State stability and production tests play an important role for variable conditions [3]. The attributes of induction machines are inherently very interesting for drive applications. They are cheap, resistant and do not have sliding contacts to use and build. When variable speed drives are used, the difficulty of induction machines and servomechanisms is that they are "difficult to control", the torque-speed ratio is analyzed and, therefore, complexity and non-linearity are analyzed [4]. An AC induction motor for more than 100 years of three-phase has proved extremely reliable when using an electromechanical conversion device. However, to act as frequency changers with modern power electronics and digital electronics to perform the required arithmetic and logic control function, induction machines are seeing increasing use in inverter applications [5]. Its characteristics have been well defined and standardized for the vast majority of that time period, it has evolved as a constant speed device operating from a constant frequency sinusoidal public service energy source and constant voltage.

Fig 1: ANN based MTC of IM Drive

II. FOCV CONTROL THEORY

The control of FOC strategy which produces and used for improving IM-drive ability [1].

The novel controller of basic amounts of: the rotor flux vector $\tilde{\psi}_r$ of the modeling of IM and x-y stationary coordinate system and the equations are:

$$\overline{\psi_r} = \psi_r e^{j\alpha\psi} \qquad (1.a)$$

i.e. it can be characterized as a vector with ψ_r magnitude and α_ψ angle, and can be designed quite convolutely.

Revised Manuscript Received on July 12, 2019.

G. Srikanth, Associate Professor, of EEE, Geethanjali college of Engineering and Technology, Hyderabad.

SG. Madhusudhana Rao, Professor of EEE, VJIT, Hyderabad, India. Country Name.

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Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/EEE/05 Date:22/07/2019

Subject: Award of the project titled **"Introducing Pulsatile flow through BLDC motor control for Ventricular Assist Devices"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

***

ORDERS:

The project titled **"Introducing Pulsatile flow through BLDC motor control for Ventricular Assist Devices"** is awarded with sanctioned amount of Rs **2,50,000/-** (Rupees two lakhs and fifty thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1. Principal Investigator : **Dr. Anil Kumar Puppala**
   Department Name : Electrical and Electronics Engineering
   Institute Name : Geethanjali College of Engineering & Technology.

2. Co-Principal Investigator-1 : **Dr. Venkateshwarlu S.**
   Department Name : Electrical and Electronics Engineering
   Institute Name : CVR College of Engineering.

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

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Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **Dr. Anil Kumar Puppala**, Geethanjali College of Engineering & Technology
2. **Dr. Venkateshwarlu S**, CVR College of Engineering

With Procs **No.JNTUH/TEQIP-III/CRS/2019/EEE/05** dated on **22-07-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed 30-03-2021. Out of the sanctioned amount of Rs **2,49,493/-**, utilized (including Interest) amount is Rs **2,49,493/-** and unspent amount for Rs **NIL** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

31/3/21

REGISTRAR

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Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/EEE/07 Date:22/07/2019

Subject: Award of the project titled **"Deep learning based Smart Assistant for blind People"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

***

ORDERS:

The project titled **"Deep learning based Smart Assistant for blind People"** is awarded with sanctioned amount of Rs.2,70,000/- (Rupees two lakhs and seventy thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1. Principal Investigator	:	**Dr. Rashmi Kapoor**
Department Name	:	Electrical and Electronics Engineering
Institute Name	:	VNR Vignana Jyothi Institute of Engineering & Technology.
2. Co-Principal Investigator-1	:	**Dr. M. Sushama**
Department Name	:	Electrical and Electronics Engineering
Institute Name	:	JNTUH College of Engineering Hyderabad.
3. Co-Principal Investigator-2	:	**Dr.M. Aruna Bharathi**
Department Name	:	Electrical and Electronics Engineering
Institute Name	:	Geethanjali College of Engineering & Technology.

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

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11. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
12. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till the completion of TEQIP-III Project
13. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
14. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
15. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
16. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
17. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
18. For any discrepancies and other relevant matters, decision of the University is final.
19. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so; it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals,
Copy to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

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(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **Dr. Rashmi Kapoor**, VNR Vignana Jyothi Institute of Engineering & Technology
2. **Dr. M. Sushama**, JNTUH College of Engineering Hyderabad
3. **Dr.M. Aruna Bharathi**, Geethanjali College of Engineering & Technology

With Procs **No.JNTUH/TEQIP-III/CRS/2019/EEE/**07 dated on **22-07-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed 30-03-2021. Out of the sanctioned amount of Rs **2,47,462/-**, utilized (including Interest) amount is Rs **2,47,462/-** and unspent amount for Rs **NIL** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

REGISTRAR

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PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/CSE/07 Date:22/07/2019

Subject: Award of the project titled **"Machine Learning Approach For Plant Disease Identification using Leaf Images"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

***

ORDERS:

The project titled **"Machine Learning Approach For Plant Disease Identification using Leaf Images"** is awarded with sanctioned amount of Rs Rs.**2,95,000/-** (Rupees Two Lakh Ninety Five Thousand Only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator Department Name Institute Name	**Dr. Ch. Ramesh Babu** Computer Science and Engineering Geethanjali College of Engineering & Technology
2.	Co-Principal Investigator-1 Department Name Institute Name	**Dr. Dammavalam Srinivasa Rao** Information Technology VNR Vignana Jyothi Institute of Engineering & Technology
3.	Co-Principal Investigator-2 Department Name Institute Name	**V.Sravan Kiran** Information Technology St.Martin's Engineering College

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

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11. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
12. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till the completion of TEQIP-III Project
13. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
14. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
15. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
16. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
17. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
18. For any discrepancies and other relevant matters, decision of the University is final.
19. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so; it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals,
Copy to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

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PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/ Chemistry/04 Date:25/09/2019

Subject: Award of the project titled **"A facile synthesis and anticancer activity of novel quinoxaline-2-carbohydrazide N-oxide derivatives."** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 17.09.2019

***

ORDERS:

The project titled **"A facile synthesis and anticancer activity of novel quinoxaline-2-carbohydrazide N-oxide derivatives."** is awarded with sanctioned amount of Rs.2,50,000/- (Rupees Two lakhs fifty thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	:	**Dr.K.Shashikala**
	Department Name	:	Chemistry
	Institute Name	:	Geethanjali College of Engineering & Technology
2.	Co-Principal Investigator-1	:	**Dr.T. Thirumala Chary**
	Department Name	:	Chemistry
	Institute Name	:	JNTUH College of Engineering Hyderabad
3.	Co-Principal Investigator-2	:	**Dr.S.Srilatha**
	Department Name	:	Chemistry
	Institute Name	:	ACE Engineering College

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. A joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
5. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
6. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
7. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
8. The Second Installment of Rs.50,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
9. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.
10. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
11. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till

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12. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
13. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
14. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
15. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
16. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
17. For any discrepancies and other relevant matters, decision of the University is final.
18. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution in three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so, it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals of lead Institute

Copy to PA to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

PRINCIPAL
Gaadhanjali College of Engineering and Technology
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ACCREDITED BY NAAC
A-GRADE

OFFICE OF THE TEQIP - III
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **Dr.K.Shashikala**, Geethanjali College of Engineering & Technology
2. **Dr.T. Thirumala Chary**, JNTUH College of Engineering Hyderabad

With **Procs No.JNTUH/TEQIP-III/CRS/2019/Chemistry/04** dated on **24-09-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed 31-03-2021. Out of the sanctioned amount of Rs **2,50,000/-**, utilized (including Interest) amount is Rs **2,51,379** /- and unspent amount for Rs 60/- is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

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REGISTRAR

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E-Mail: pa2registrar@jntuh.ac.in

PROCEEDING OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No. 30 of 2008)
Kukatpally, Hyderabad - 500 085, Telangana (India)
PRESENT Dr. N. YADAIAH REGISTRAR

Procs No JNTUH/TEQIP-III/CRS/2019/ Mathematics/04 Date:25/09/2019

Subject: Award of the project titled **"Peristaltic Transport of Nanofluids"** under Collaborative Research Scheme, TEQIP-III, JNTUH

Read: Note order of the Vice-Chancellor dated 17/09/2019

***

ORDERS:

The project titled **"Peristaltic Transport of Nanofluids"** is awarded with sanctioned amount of Rs.2,00,000/- (Rupees Two lakhs only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	:	**Dr. N.Subadra**
	Department Name	:	Mathematics
	Institute Name	:	Geethanjali College of Engineering & Technology
2.	Co-Principal Investigator-1	:	**Dr. M.A.Srinivas**
	Department Name	:	Mathematics
	Institute Name	:	JNTUH College of Engineering Hyderabad
3.	Co-Principal Investigator-2	:	**Dr. Sunil Dutt Purohit**
	Department Name	:	Mathematics
	Institute Name	:	Rajasthan Technical University

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. A joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
5. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
6. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
7. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
8. The Second Installment of Rs.50,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
9. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.
10. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
11. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till the completion of TEQIP-III Project

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12. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
13. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
14. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
15. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
16. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
17. For any discrepancies and other relevant matters, decision of the University is final.
18. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution in three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so, it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals, of lead Institute

Copy to PA to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

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FORM G
(Final Financial Statement)

1. Sanction letter no.

   Proc.No. JNTUH/TEQIP-III/RS/2019/Mathematics/04

2. Total Project Cost — Rs. 2,00,000

   Sanction / Revised Project cost (if applicable) — Rs. 2,00,000

3. Date of Commencement of Project — 12/09/2019

4. Date of completion of project — 28/02/2021

5. Grant revised in each year (Financial)

Sl No.	Sanctioned Heads	Funds Allocated (Rs.)	Balance (if any)			Remarks		
			I Installment	II Installment	III Installment	Total		
1	2	3	4	5	6	8	9	10
1	Manpower	30,000	15,000	15,000	-	30,000		
2	Non Consumables	60,000	19,967	40,033	-	60,000		
3	Consumables							
4	Travel	20,000	20,000	-	-	20,000		
5	Field Visit	20,000	6717	-	13283	20,000		
6	Overhead Expenses	40,000	10,000	-	30,000	40,000		
7	Others (if any)	30,000	7,090	20,312	806+817+3600=5223	32,625		
8	Bank Charges				262	262		
	Total	2,00,000	78,774	75,345	48,768	2,02,887.00		

Amount to be refunded/ reimbursed (whichever is appropriate): Nil

Signature of the:

a) Principal Investigator: Subha

b) Co-Investigator-I

c) Co-Investigator-II

Signature of the Head of the Institution with Seal

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Geethanjali College of Engineering & Technology, Sy. No. 33 & 34, Cheeryal Village, Keesara Mandal, Medchal Dist.

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PROCEEDING OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/ECE/07 Date:22/07/2019

Subject: Award of the project titled **"Speech Enabled IVR based online market place for Farmers"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

***

ORDERS:

The project titled **"Speech Enabled IVR based online market place for Farmers"** is awarded with sanctioned amount Rs. **2,99,000/-** (Rupees Two Lakh Ninety Nine Thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	**D. Mohan**
	Department Name	Electronics and Computer Engineering
	Institute Name	Sreenidhi Institute of Science & Technology
2.	Co-Principal Investigator-1	**Dr. K. Anitha Sheela**
	Department Name	Electronics and Communication Engineering
	Institute Name	JNTUH College of Engineering Hyderabad
3.	Co-Principal Investigator-2	**Mr. P. Sudhakar**
	Department Name	Electronics and Communication Engineering
	Institute Name	Geethanjali College of Engineering and Technology

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

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ISSN: 1314-3395 (on-line version)
url: http://www.acadpubl.eu/hub/
Special Issue

HYBRID SIGNED DIGIT PARALLEL AND MULTI OPERAND BCD ADDERS

G.Sreelakshmi[1],Dr. Kaleem Fatima[2],Dr.B.K.Madhavi[3],
Geethanjali College of Engineering and Technology[1],
Muffakamjah College of Engineering and Technology[2],
Sridevi Womens Engineering College,Hyderabad[3]

June 25, 2018

Abstract

Decimal Arithmetic is having its own significance in many fields like commercial, financial, industrial and scientific applications. It plays a vital role in Floating point and Fixed point Decimal Processors. Adders and Multipliers are basic building blocks of any arithmetic unit. This paper presents a new method for the decimal signed digit addition based on the vinculum digit set {-5, 5} where the delay associated with carry generation and propagation is significantly reduced. The proposed Hybrid signed digit adder, adds two N-digit operands using binary fast adders in parallel. The correction logic is parallel applied along with one previous stage hybrid carry. This reduced the critical path delay very significantly. Multi operand BCD addition up to 8 operands is successfully implemented using the above mentioned parallelism in binary tree method. The proposed multi-operand BCD adder is 3 times faster compared to the method proposed in Signed Digit Adder multi operand adder of [17]. All the designs are implemented in Verilog HDL and tested exhaustively on FPGA and cadence digital encounter tools 0.18m technology and the results show that the proposed

URSI AP-RASC 2019, New Delhi, India, 09 - 15 March 2019

Code-phase based combined GPS-Galileo positioning using Ionosphere-free linear combination

V. Satya Srinivas* (1) and K. Yedukondalu (2)
(1) Department of ECE, Geethanjali College of Engineering and Technology, Cheeryal(V), TS, India, http://www.geethanjaliinstitutions.com/engineering/
(2) Dept of ECE, CVR College of Engineering, Vastunagar, Ibrahimpatnam (M), Hyderabad, India http://cvr.ac.in/home4/

Abstract

To reduce the uncertainty in location information supplied by GNSS receiver, the range errors (clock bias, troposphere, ionosphere, multipath etc.,) have to be eliminated. The linear combinations of multi-frequency GNSS observables, will aid in eliminating most of the errors. The ionospheric error is treated as predominant error and can be mitigated by using ionosphere-free linear combination. In this paper, the attainable accuracy using ionosphere-free linear combination of combined GPS L1I/L5 and Galileo E1/E5a is evaluated for single point positioning. Taking the advantages of availability of civilian codes on signal frequencies, code-phase measurements are used instead of carrier-phase. The 95th percentile horizontal, vertical and 3D position accuracies are 1.08m, 0.80m and 1.81m respectively

1. Introduction

The reliability of GNSS range measurements are degraded due to systematic errors or biases and random noise as well. Therefore, pre-processing, processing, analysis and proper interpretation of measurement data is required for achieving optimal navigation solution. The issues addressed in pre-processing include cycle slip detection and repair, ambiguity resolution and code smoothing. The mitigation and modelling of biases and systematic errors in measurements comes under processing. Several algorithms using single, double and triple difference techniques are developed with various linear combinations of dual frequency data for static and kinematic applications. The common limitation among these techniques is that, they depend on the baseline distance between the pair of receivers involved for processing the data. Apart from differencing techniques, new observable can be derived from the basic GNSS observations of multi-frequency, such that new signals can be generated with various with unique properties capable of eliminating GNSS errors and this is achieved using linear combinations [1]. In the present study the ionosphere-free linear combination in position domain for dual system (GPS and Galileo) is investigated.

2. GNSS signal characteristics

The modernization of GPS and upcoming Galileo provide open services with new civilian codes on the following three radio frequencies L1/L2/L5 and E1/E5a/E5b respectively. The wavelengths of these signals are in between 19-25 cm. The frequencies of the signals are L1 L1(1575.42 MHz), L2 (1227.60MHz) and L5 (1176.45 MHz) and in case of Galileo E1(1575.42 MHz), E5a (1176.45 MHz), E5b (1207.14 MHz). These carrier frequencies are Bi-phase modulated in GPS and BOC modulated in Galileo system, by spread spectrum codes with a unique PRN sequence associated with each satellite vehicle (SV) and by the navigation data [2]. The dual mode GPS/Galileo with open service signals will enhance robustness of the navigation solution. Even in future, the dual frequency GBAS system can be deployed and get benefited from these new signals. Therefore, an attempt is made to evaluate the dual mode GPS/Galileo positioning using L1/L5 and E1/E5a signals.

3. Linear combinations

Developing various linear combinations of multi-frequency phase or code data, an optimal pseudo observation can be derived. The optimal combination will aid in elimination or mitigation of GNSS errors. Several linear combinations are proposed using GPS L1/L2 data. The various linear combinations are, narrow-lane, ionosphere-free, wide-lane, semi-wide-lane, and geometry-free combinations etc. The systematic errors eliminated using a specific linear combination can be found in open literature [3].

In particular, with ionosphere-free linear combination, most of the analysis carried out is mostly in measurement domain and not in position domain. The advantage of using linear model is that it can be directly in least squares adjustment to obtain position solution and eliminates using of a particular ionospheric model. Because, though Global, regional and local ionospheric models are being developed for supporting GNSS systems worldwide. The spatial and temporal resolution of these models is limited and major error still remains at times of high solar activity periods.

3.1 Ionosphere-free linear combination

This linear combination eliminates the effect of ionosphere. This is widely used in time and frequency transfer applications as well. The noise in the derived measurements is less. The possible ionosphere-free combinations using GPS frequencies can be found in open literature [3]. The ionosphere-free linear combination or

the tandem device. The thickness of CZTS absorber is varied as an attempt to equalize the absorption in top in bottom modules and the performance optimization of the tandem structure is carried out for different tunnelling layers. The tandem structure produces maximum efficiency of 20.93% with Titanium Nitride (TiN) as tunnelling material whereas the maximum efficiency exceeds more than 22% for Si-CZTS tandem solar cell with ITO as tunnelling material. The efficiency can be enhanced further by reducing the overlapping portion of the EQE graph in the tandem structure.

Keywords

Device modeling **CZTS** **HIT**

Tandem Solar Cell

URSI AP-RASC 2019, New Delhi, India, 09 - 15 March 2019

Position Domain analysis of modernized GPS Ionosphere-free Code Observations

V. Satya Srinivas* (1) and K. Yedukondalu (1)
(1) Department of ECE, Geethanjali College of Engineering and Technology, Cheeryal(V), TS, India,
http://www.geethanjaliinstitutions.com/engineering/
(2) Dept of ECE, CVR College of Engineering, Vastunagar, Ibrahimpatnam (M), Hyderabad, India
http://cvr.ac.in/home4/

Abstract

New signals (L2C and L5) are added as a part of GPS modernization to improve the achievable accuracy of the system. Compared to the legacy signals (L1/L2), new signals provide good cross-correlation performance, Forward Error Correction (FEC) and tracking facility. But the systematic errors in range measurements are the concern, particularly due to the ionospheric delay. The ionosphere-free linear combinations of dual frequency code or carrier phase measurements can be used to correct the refraction effects on GPS signals. The availability of L2C and L5 on Block-IIRM satellites has given an opportunity of direct comparison of coded signals instead of carrier-phase measurements. Simulation studies in the open literature on optimal linear combinations are focused in measurement domain. The analysis in respect of precision on coordinate parameters is essential to realize the optimal linear combination in position domain. Two ionosphere-free linear combinations L1/L5 and L2C/L5 of undifferenced/zero-differenced GPS coded signals are investigated for Single Point Positioning (SPP).

1. Introduction

Modernization of GPS is in progress by providing services through new civilian signals such as L5 and L2C along with Military codes on L1 and L2 signals. The L5 signal is the third civilian signal, after L1C/A and L2C. These three civilian signals can be used for Standard Positioning Services (SPS) by all the GNSS users worldwide for free of cost. Correcting for ionospheric error is a significant challenge to improve the positional accuracy. Either code-phase or carrier phase measurement on different frequencies can be combined to compensate for ionospheric delay. The undifferenced pseudorange/code-phase observables can be processed to obtain Single Point Position (SPP) solution.

Extensive research by Cocard and Geiger [1], Han and Rizos [2], Odjick [3] and Richert [4] outlines the criteria for optimal linear combinations using dual and triple frequency carrier phase measurements. However, the focus is into the measurement domain but not in the position domain. Also in case of triple frequency most of the research reported is based on simulated of signal measurements. In critical applications like Local Area Augmentation systems (LAAS) for category precision landing of aircrafts, code-phase measurements are processed for navigation solution. Therefore, in this paper the undifferenced dual and triple frequency ionosphere-free code-phase linear combinations in position domain are evaluated.

2. Modernized GPS Signals

The satellites from Block-I through Block-IIR transmits C/A-code on L1 frequency and P(Y) code on both L1 and L2 frequencies. However, the new generation of satellite vehicle Block-IIR-M (L2C) and Block-IIF (L5I and L5Q) are under deployment to transmit additional civil signals. In addition to this, for PPS an M-code signal on L1 and L2 frequencies is transmitted to overcome the legacy P(Y) code in terms of accuracy and security. The representation, L2C indicates civil signal on L2 carrier frequency. As the L2C signal belongs to Radio Navigation Satellite Services (RNSS) band, it is not appropriate for civil aviation. On the other hand, L1 and L5 can be used for safety of life applications, as these frequencies belong to Aeronautical Radio Navigation Service (ARNS) band. The L5 signal is the third civilian signal, after L1C/A and L2C. The Block III GPS satellites will have the fourth civilian signal L1C superimposed on L1 carrier in near future. This is a new civil signal that has backward compatibility with L1C/A.

3. GPS principle of operation

The GPS receivers track and acquire afore mentioned signals, and measure ranges to all the satellites in-view to estimate the user's position in 3-D (latitude, longitude and height). Let the user be at xu, yu and zu in earth fixed, earth centered coordinate system and the Satellite Vehicles (SVs) be at xi, yi and zi (where i=1,2,3,4) in the same coordinate system as the user. Fig. 1. depicts principle of operation. Assuming that the user starts his clock at tu seconds, receives signals at ti (i=1, 2, 3, 4) seconds from SV and Δt is the time offset between the user and SV. 3D position and time offset are obtained by simultaneously solving the nonlinear equations [5],

$$(x_u - x_i)^2 + (y_u - y_i)^2 + (z_u - z_i)^2 = c(t_i - t_u + \Delta t)^2 \quad (1)$$

Praise Worthy Prize

International Review on Computers and Software (IRECOS)

QMCP: QoS Aware Multi-Channel Path Discovery for End to End Data Transmission Over Cognitive Radio Ad Hoc Networks

Nagul Shribala[1], P. Srihari[2], B. C. Jinaga[3]*

[1] ECE Department, Jawaharlal Nehru Technological Unversity, India
[2] ECE Department, Jawaharlal Nehru Technological Unversity, India
[3] ECE Department, Jawaharlal Nehru Technological Unversity, India
[*] *Corresponding author*

DOI: https://doi.org/10.15866/irecos.v11i12.10978

Abstract

ICT (Information and Communication Technology) trends are fast emerging and globally leading to the substantial demand of spectrum channels used for wireless networks. Cognitive Radio (CR) is an emerging technology solut on that shall work on dynamic spectrum channel allocation. In cognitive radio ad hoc networks (CRAN), it is often difficult to establish the path among nodes with direct channel. Hence it is obvious to establish the path through the set of channels in sequence. The constraint is quality of service (QoS). Path establishment by the multiple channels in sequence needs a dynamic channel assignment for ensuring an optimum utilization of the available resources, whilst minimizing the interference in a network. In this paper, the emphasis is on Multichannel transmission Path with optimal QoS fitness for Cognitive Radio Networks. The proposed model is called QoS aware Multi-Channel Path (QMCP) discovery for end-to-end data transmission over CRAN. The QMCP performs the evolutions using adaptive genetic algorithm on the initial multichannel paths discovered in order to obtain the best fit path. The QoS metrics defined in our earlier contribution are used in fitness function. Results from the study reflect the robustness of the proposed model which could certainly

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DOI: 10.1002/ima.22451

RESEARCH ARTICLE

WILEY

Segmentation of tumor using PCA based modified fuzzy C means algorithms on MR brain images

Karuna Yepuganti[1] | **Saritha Saladi**[2] | **C. V. Narasimhulu**[2]

[1]School of Electronics Engineering, Vellore Institute of Technology, Vellore, India

[2]Geethanjali College of Engineering and Technology, Hyderabad, Telangana, India

Correspondence
Email: saritha.saladi3188@gmail.com

Abstract

In the field of medical sciences, automatic detection of tumor using magnetic resonance (MR) brain images is a major research area. The goal of the proposed work is to identify the tumors in MR images using segmentation methods and to locate the affected regions of the brain more accurately. Medical images have vast information but they are difficult to examine with lesser computational time. An innovative process is proposed to extract tumor cells using the discrete wavelet transform (DWT). After extracting features with DWT feature reduction is carried out with the principal component analysis (PCA). Modified fuzzy C means (MFCM) technique is used for segmenting the tumor cells. The efficiency of the proposed method to identify different abnormalities in real MR images for intracranial neoplasm detection, tuberculoma, and bilateral thalamic fungal granulomas identification is tested. The results obtained are shown in-terms of Accuracy, Dice Similarity Index (DSI), and Jaccard Index (JI) measures. The performance of the proposed method is tested in terms of performance measures like Accuracy, DSI, and JI. These results are compared with the conventional fuzzy C means (FCM) method.

KEYWORDS

brain tumor, DWT, feature extraction, fuzzy C means and MRI

1 | INTRODUCTION

The objective of the medical image processing techniques is to identify images or objects with tranquil visually. Medical images are used as an evidence for the physical attributes. MRI images are used to identify tumors in brain. The most significant aspect is segmenting the tumors to locate the actual position and regions of the abnormal tissues in MRI images. The tumors can have variability in shape, size, and can appear at any position in brain with diverse intensities. They are classified into two categories:

- Benign tumors are consistent compositions that do not enclose cancer cells. They are simple to monitor by radiological apparatus. These tumors may eternally develop back again.
- Malignant tumors are inconsistent compositions and they comprise of cancer cells. They have to be treated by the combination of radiotherapy and chemotherapy. They are life frightening.

In this article, we have concentrated on three types of diseases:

1. *The intracranial neoplasm disease*: It is formed when abnormal cells mount up in the interior lobe of the brain, formally named as a tumor. These cells reproduce in an abandoned way and destruct the brain tissues.

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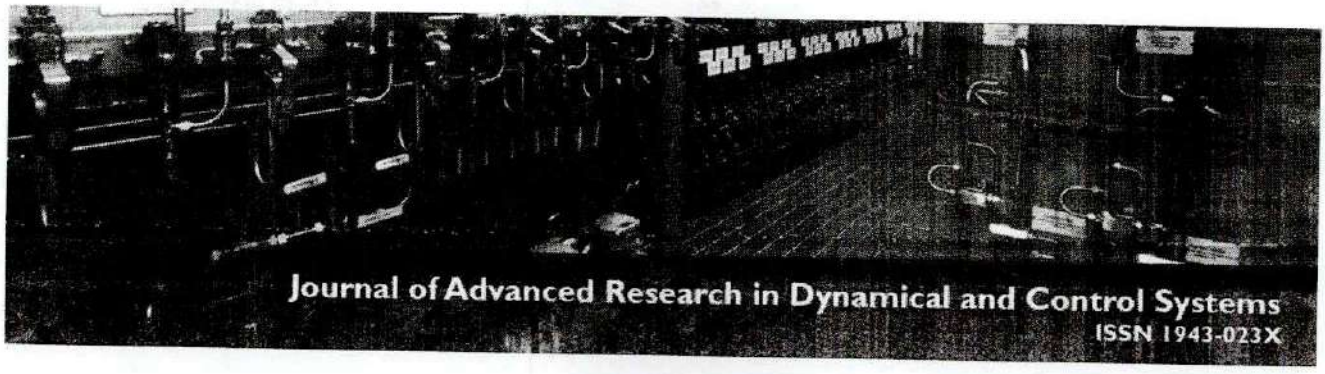

Software Defined Radio with LFSR and Hard Decision based Viterbi Decoder

Alajangi Rama Krsihna, Balaji Narayanam , P. Srihari

Abstract:

This paper describes about Software Defined Radio (SDR) design for the prospect of testing the Bit-Error Rate (BER) and power analysis of digital communication schemes (ASK, FSK, BPSK) using Xilinx system generator. The design was implemented using Xilinx and MATLAB Simulink. This design describes the process of channelization as it exploits to low power and high efficiency applications in communication industry (such as wireless, satellite and cellular systems) and Digital Signal Processors. A SDR is defined as radio in which some or all of the physical layer functions are software defined. The SDR radio frequently has to load various signals depending on their requirements, which may use different source coding, modulation schemes, channel coding and demodulation schemes. The conventional hardware based radio devices have an extent on cross functionality and a slight flexibility in mounting multiple waveform with high hardware cost. This problem is solved by Software Defined Radio (SDR) architecture with Fibonacci Linear Feedback Shift Register and Viterbi Decoder.

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IMPLEMENTATION OF HIGH SPEED VEDIC BCD MULTIPLIER USING VINCULUM METHOD

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Abstract: This paper presents a BCD Multiplier that operates on Vedic Mathematics called Vedic sutras. It uses a method called Vinculum which converts higher complex numbers into its simplest form. In Decimal number system the numerials 6,7,8,9 are called high complex numbers and numbers consisting of 6,7,8,9 are converted into 4,3,2,1 there by total number or any number is between 1 to 5 digits only for any arithmetic operation. This feature reduces Carry generations and Carry propagations there by performance parameter like delay reduces especially in adders and multiplier structures. We choosen an arithmetic operation multiplication and it is compared with Conventional Multiplier [1] [2] [3] and Vedic Multiplier[5] and it has been observed that improvement in speed is 83.5% in case of conventional multiplier and 47.8% in case of vedic multiplier which is suitable for High Speed Applications.

The Architecture is implemented using Xilinx Vertex 4 FPGA and the same is done using Cadence Digital Encounter Tools of TSMC180nm Technology. The results indicate that the proposed BCD multipliers is very efficient in terms of speed when compared to decimal multipliers implemented with direct manipulation of BCD numbers.

Key words: BCD multiplier, High speed, Vedic Mathematics, Vinculum multipliers.

1. Introduction:

Decimal Arithmetic plays a very vital role in many Finance, Business and Commercial Applications for which binary arithmetic is not suitable. From the last decade lot of research is going on decimal arithmetics and Decimal Floating point number systems where most of research papers or literature is on conversion of Decimal numbers into Binary numbers and from Binary to Decimal numbers with various Encoding and Decoding methods [7] [8] [10]. Small attempt was done in a different method using Vedic mathematics which is an emerging technology in engineering branches where we can perform all decimal arithmetic operations in a simple and easiest method. It was proved theoritically that vedic method is faster than conventional method mathematics and most of researches are motived in this angle for engineering applications.Vedic Mathematics holds good for both binary and decimal number systems [5] [14] [15].

The outline of the paper is arranged as follows. In Section 2 Vedic Mathematics and Sutras related to multiplication is presented. In Section 3 Concepts of Vinculum numbers, its Algorithm with examples is discussed. In Section 4 Detailed description of Proposed Vedic BCD Multiplier with Conversion Logic, Partial Product generation and its Adder structure is explained. Simulation and Synthesis results are discussed in Section 5 and Conclusion with Future scope in Section 6.

2. Vedic Mathematics and Sutras related to multiplication:

Among four Vedas Rig Veda is the root for Vedic mathematics which is an ancient method. It consists of 16 basic formulas also called sutras or aphorisms and 14 sub formulas. They were presented by a Hindu scholar and mathematician, Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja, during the early part of the 20th century [1]. The word "veda" means "knowledge" in sanskrit. Famous Indian Mathematicians like Aryabhatta, Brahmagupta, and Bhaskara II made their contributions to geometry, algebra, computational mathematics like irrational

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Electrical Drive System Modeling for Real-Time Digital Simulation Applications

G. Srikanth, G. Madhusudhana Rao

Abstract: In this paper the digital simulation of physical system in MATLAB-SIMULINK for real-time applications is simulated for partial-scale or full-scale and validated simulation results with the existing system. One of the applications is AC drive systems with speed adjustability not only limited to equipment's of electrical. The proper selection of AC motor drive is one of the main resolves of this paper. The efficient control of speed and torque is the second aim by considering the flux weakening regions.

Index Terms: Induction motor, Vector control, Flux-weakening region, Artificial Intelligent controllers.

I. INTRODUCTION

Depending upon the types of loads now days the growing demand is increased and the complexity also increased. The main objective and challenging is testing and verification of the loads and drive system. The realistic calculations and simulation studies are done with varying loads of mechanical. There are many learning and exhaustive algorithms of controllers to control the electric drives and control irrespective of the power specifications. Several experimental and laboratory experiments and tests are been conducted.

For high-power electric drives with all customized controllers for different applications by varying electric drive is designed and tested [1]. To use fully real-time digital simulation a recent alternative way of testing that is fast becoming is quite popular. Interfacing of these simulations with industrial controllers, thus saving a lot of cost of the investment amount and an economic tool is allowed for testing of drive controller in all power ranges and offering the machine simulations flexible [2].

"Online data and signal process for analysis purposes" of the use of virtual system drive systems enables relatively easier interface to the computer and faster and Earlier hardware which replaces the equivalent model of the drive system. The commonly used drive systems are induction motor, stepper motor, servomotor and synchronous motor and the same has been tested with different conventional and AI controllers, the hardware. Recently real time systems in fully digital simulation tested with regulator as well as experimental using a simulation [1] With the problem of modeling and real-time simulation, a converter starts and stops the drive for variable speeds and applications to develop models for electric vehicles and electric hybrids [3]. Proposal for the modeling of the drive system by block diagram representation and state space

Analysis, which is simulated in MATLAB, which is an easy to use software. State stability and production tests play an important role for variable conditions [3]. The attributes of induction machines are inherently very interesting for drive applications. They are cheap, resistant and do not have sliding contacts to use and build. When variable speed drives are used, the difficulty of induction machines and servomechanisms is that they are "difficult to control", the torque-speed ratio is analyzed and, therefore, complexity and non-linearity are analyzed [4]. An AC induction motor for more than 100 years of three-phase has proved extremely reliable when using an electromechanical conversion device. However, to act as frequency changers with modern power electronics and digital electronics to perform the required arithmetic and logic control function, induction machines are seeing increasing use in inverter applications [5]. Its characteristics have been well defined and standardized for the vast majority of that time period, it has evolved as a constant speed device operating from a constant frequency sinusoidal public service energy source and constant voltage.

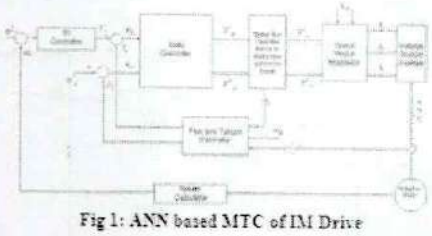

Fig 1: ANN based MTC of IM Drive

II. FOCV CONTROL THEORY

The control of FOC strategy which produces and used for improving IM-drive ability [1].

The novel controller of basic amounts of the rotor flux vector $\vec{\psi}_r$ of the modeling of IM and x-y stationary coordinate system and the equations are:

$$\overline{\psi_r} = \psi_r e^{j\omega t} \qquad (1.a)$$

i.e. it can be characterized as a vector with ψ_r magnitude and ω_s angle, and can be designed quite convolutely.

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Deep convolutional Neural Network in Smart Assistant for Blinds

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Abstract— **Increasing pollution and changing life styles has severely affected human health specially our sense organs. More exposure to screen has increased vision related problems even at very early age of life. The developing technologies should be utilized to help the persons with no or very less vision to lead an independent life in society. Computer vision is one such field that can be utilized to develop some cost effective products that can be very useful for these scenarios. The detection and recognition of text from natural image can be very useful for visually imparted persons as well as in various other applications like developing a smart system to help driver in getting voice signal for every road sign, and even warning if we did not follow the one. The proposed work uses deep convolutional neural network to implement a text detection and recognition system that is much simpler and faster as compare to traditional hand crafted feature based methods.**

Index Terms—**Convolutional neural network, deep neural network,**

I. Introduction

"VISION" is one of the most precious gift we have received from nature. But many among us could not receive this gift or lost this gift because of different reasons. Life of all these people becomes very difficult and they need to be dependent on others for each work. One of main reason for this is excessive exposure to screen. Many measures are already taken the government as well as non-government organizations to help such persons.

Artificial intelligence has lead to many smart devices that can help human in various fields of life. These technologies can also be utilize to help visually impaired persons. Deep convolutional neural network is one such technology that has made object detection face detection possible.

The computer vision is the key to develop various products that can help to provide artificial vision to various people. This artificial vision can be for face detection, object detection, text detection and recognition or the combination of all of these. The present work is a initial step for development of one such cost effective and easily portable or wearable device. The current project considers a scenario where a person suffering from a visual impairment needs a tool to carry around, and receive a voice signal for the texts that are available around him. This will help in getting information from sign boards at various places.

Some products are available in the international market like one shown below but they are very costly (between 1500$ to 2000$):

1. Assisted Vision Smart Glasses: They are constructed using transparent OLED displays, two small cameras, a gyroscope, a compass, a GPS unit, and a headphone. Most visually impaired people can distinguish light and dark, these glasses can make anything that's close to the wearer brighter, so they can discern people and obstacles. The main problem with theses glasses is they are very costly and cannot identify text from images.

2. A wearable device called Horus is using combination of computer vision, machine learning and audio cues to improve the lives of visually impaired people. Developed by a Swiss startup called Eyra, Horus consists of a headband with stereo cameras on one end that can recognize text, faces and objects. Information from the cameras is fed via a 1m cable into a smartphone-sized box containing a battery and a NVIDIA Tegra K1 processor. This provides GPU-accelerated computer vision, deep learning and sensors that process, analyze and describe the images from the cameras.

Apart from this one more device, available in market is "figure reader". This MIT Media Labs project is a wearable device a very chunky ring that sits on the finger and is capable of detecting and interpreting 12-point printed text as the user scans his or her finger across it. It reads aloud in real-time. Small vibrations alert the wearer to any deviation off the line. Seeing AI, an app developed by Microsoft AI & Research. It essentially narrates the world for blind and low-vision users, allowing them to use their smartphones to identify everything from an object or a color to a dollar bill.

But when the exact location of text is not known or the distance between the user and text is much more, these scanner based devices will not be much affective.

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Comparative Study of Maximum Torque Control by PI ANN of Induction Motor

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Abstract

A novel maximum torque per Ampere (MTPA) controller for the induction motor (IM) drives is presented. It is shown to be highly suited to applications that do not demand an extremely fast dynamic response, for example, electric vehicle drives. The proposed MTPA field oriented controller guarantees asymptotic torque (speed) tracking of smooth reference trajectories and maximizes the torque per Ampere ratio when the developed torque is constant or slow varying. An output ANN based feedback linearizing concept is employed for the design of torque and flux subsystems to compensate for the torque-dependent flux variations required to satisfy the MTPA condition. As a first step, a linear approximation of the IM magnetic system is considered. Then, based on a standard saturated IM model, the nonlinear MTPA relationship for the rotor flux are derived as a function of the desired torque, and a modified torque-flux controller for the saturated machine is developed. The static and dynamic flux reference calculation methods to achieve simultaneously an asymptotic field orientation, a torque-flux decoupling, and an MTPA optimization in a steady state, is proposed. The proposed ANN based MTPA control algorithm also demonstrates a decoupling of the torque (speed) and flux dynamics to ensure asymptotic torque tracking. In addition, a higher torque per Ampere ratio is achieved together with an improved efficiency of electromechanical energy conversion.

INTRODUCTION

During recent decades there has been a growing trend within many applications to replace the induction machine (IM) with a permanent magnet synchronous machine (PMSM) due to its higher efficiency, torque, and power density. However, the cost of a PMSM is significantly higher than that of the IM due to the use of rare-earth magnetic materials which have a very limited origin and their cost is continuously increasing. The tendency to reduce the use of expensive rare-earth magnets in industrial and electrical traction drives has driven a renewed interest for research into advanced design and control concepts for IM. Field-oriented vector control (FOC), advanced FOC, and direct torque control (DTC) of IMs have been established as a defacto industrial standard for high and medium dynamic performance applications. Vector controlled and DTC IM drives typically operate with constant flux magnitude even at low values of produced torque which results in a good dynamic performance. However, conversely, the machine efficiency and power factor can be low, especially for small torque values.

The IM torque is a product of the flux amplitude and the torque component of the stator current, providing a degree of freedom for reduction of the power conversion losses or for attaining other performance criteria. The optimization techniques typically reported in publications adjust the flux level as a function of the electromagnetic torque using various optimization procedures. The flux regulation restricts the drive's dynamic performance; hence, this approach can be employed in applications not requiring an extremely fast response, for example, in electric vehicle drives where the drive only operates at a rated torque for a limited proportion of time. A number of control strategies to optimize different performance objectives are known including minimization of active and total losses, power factor maximization, maximum torque per Ampere (MTPA) control, maximum torque per voltage control, and maximum power transfer. The established optimization methods are designed for a steady-state operation (i.e., the drive is operating in constant torque). Dynamic behavior optimization during torque transient is only considered in very few papers.

MTPA control minimizes the stator current for a given machine torque. Maximizing the machine torque by having limited source voltage and inverter current capability improves the electromechanical system performance. This is particularly beneficial for traction systems. Under the MTPA control strategy, the torque controller adjusts the flux reference to increase the efficiency at low loads. As a result of this optimization, the torque per Ampere ratio is maximized and, in addition, the achievable values of motor efficiency are close to those obtained using the minimum active losses optimization criterion. The basic MTPA control objective is achieved by controlling stator current torque and flux components, expressed in terms of rotor flux reference frame, to be equal. This leads to an IM operation with a constant slip frequency which is equal to the reciprocal of the rotor time constant. The MTPA relations are derived from the condition of the IM when producing constant electromagnetic torque. A few theoretical results based on vector and scalar control concepts are: modified field-orientated control nonholonomy approach, and voltage frequency control. However, simultaneous control of machine torque and flux results in poor torque dynamics; moreover, these dynamics cannot be specified due to the complexity and nonlinearity of the controlled plant (IM).

For all the optimization techniques above, an important issue for the variable flux operation is the machine saturation effect. This effect results in varying machine inductances; hence, the assumption of linear magnetic circuits, common for standard

Additive Manufacturing for VADs and TAHs - a Review

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Abstract. Heart disease or Advanced/Congestive Heart Failure (CHF) is one of the serious causes of death. Due to availability of low volumes of donor hearts, there has been an ongoing development of Mechanical Circulatory Support (MCS): Ventricular Assist Devices (VADs) and total heart replacement by Total Artificial Hearts (TAHs) for over 60 years. MCS systems had seen three phases of advancement. The first generation were largely mechanical devices and had pulsatility in their action, but were highly cumbersome, unreliable due to fatigue cracks and required an external pneumatic power and control. Smaller and continuous flow devices are the second generation MCS devices. Because of compact sizing they were suitable for implantations and were more durable than the first generation devices. Problems like pump thrombosis drove the development of motors with levitating or hydrodynamic rotors, leading to the development of third generation devices. Manufacturing of these electromagnetic devices for implantation has to adhere to the constraints of compatibility, space and weight. With the advent of new biomaterials, additive manufacturing is reportedly playing a significant role. Additive manufacturing reported for electromagnetic and electronic components had yielded considerably good performance. This paper reviews materials in electrical and electronics and also in bio medical sector suitable for Additive Manufacturing. An attempt is made to identify the materials that may be suitable for VADs and TAHs and the challenges to use AM techniques that complement each other to create next generation integrated-VADs and integrated-TAHs.

1. Introduction

Due to the less availability of donor hearts [1], there has been an on-going development of Mechanical Circulatory Support (MCS) as VADs and as total heart replacements by TAHs for over 60 years as bridge to transplant or as a destination therapy [2-6]. Natural myocardial performance when replaced by MCS in pre-transplant patients was shown to improve post-transplant rates of mortality [7-9].

Mechanical circulatory frameworks had seen three phases of advancement. The first generation mechanical circulatory support devices were largely mechanical devices, which were highly cumbersome, unreliable due to small fatigue cracks and required an external pneumatic power and control. These devices had Pulsatility in blood flow. Smaller and continuous flow devices are the second generation MCS devices, which were electro-mechanical. They were more reliable and compact than the first generation. The lifetime was limited to 1-2 years, but failed to get pulsatility in flow. Diminished nature of pulsatility increased the pressure gradients on the aortic valve; left ventricular recovery rate got slower [10]. Problems like pump thrombosis prompted the development of non-bearing type of devices leading to the development of third generation devices, where the rotors/pumps magnetically/hydrodynamically levitate, thereby providing better hemocompatibility [11] . Manufacturing of these electromagnetic devices for implantation has to adhere to the constraints of space and weight apart from being bio-compatible. Researchers are trying to understand why the blood interacts with the artificial surfaces of the pumps to cause clotting and inflammation and thereby develop surfaces that avoid the same [13].

Longevity, hemocompatibility issues combined with predicted increasing demand for heart valve replacements has evoked the search for alternative fabrication methods of heart valve replacements [14],

Performance Analysis of Classical Controllers Tuned Using Heuristic Approaches for Frequency Regulation

Preeti Dahiya, Sandeep Dogra, Veena Sharma, Harish Pulluri, N. Gouthamkumar and U. Mohan Rao

Abstract This paper presents the performance analysis of classical controllers tuned using heuristic approaches for frequency regulation. The system under study comprises of two areas each having one thermal turbine in each control area. The frequency regulation is achieved using different classical controllers whose controller gains have been optimized using heuristic techniques namely genetic algorithm (GA) and gravitational search algorithm (GSA). To overcome the concerns of local trapping in local minima, hybridized GSA incorporating the concept of opposition learning and disruption, i.e., disrupted oppositional learned gravitational search algorithm (DOGSA) has also been used for optimization of controller gains.

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Synthesis And Charecterization Of $LiMn_{1.5}Ni_{0.5}O_4$ By Sol-Gel Method For Cathode Material & It's Application In Li-Ion Battery

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Abstract. Our past decade witness to the quick growth of Li-Ion battery industry in response to the growing needs of electronic and information industries. Lithium Cobalt Oxide used as Initial cathode material for Lithium batteries application it consist of high toxic nature, costly and with low energy density. Thus there need to develop new Li-Ion batteries to improve above characteristics along with efficiency and make it portable. So that can be used in electronics, transportation, and energy storage and especially in hybrid electric vehicles.$LiMn_{1.5}Ni_{0.5}O_4$ is hence the best development seen so far. It is improved version of $LiCoO_2$. It usually overcomes all the problem of older lithium batteries. The high initial capacity and good cycling behavior of $LiMn_{1.5}Ni_{0.5}O_4$ powders calculated at higher temperatures are closely related with the higher crystalinity and retention of the spinel structure with cycling and hence proved that $LiMn_{1.5}Ni_{0.5}O_4$ is far better than other batteries. For synthesizing $LiMn_{2-x}Ni_xO4$, we use sol-gel procedure. The electro chemical performances of prepared samples are tested. The crystalinity and lattice constants by X-Ray diffraction, thermal analysis by TGDTA, morphology by SEM and bonding between the atoms by FTIR were studied in this paper.

INTRODUCTION

In order to improve the efficiency energy density of LIBs, the cathode materials having either high reversible capacity or high operating voltage have been developed. Ni doped manganese spinel having operating voltage higher than (>4.6Vvs.Li/Li^+) that of conventional $LiMn_2O_4$ (4V) cathode material. The 4V manganese spinel suffers from structural degradation and John-Teller distortion, which is occurred due to Mn valance changes to Mn^{3+} in discharging period. This problem is overcome by the Ni doped Mn spinel $LiMn_{1.5}Ni_{0.5}O_4$ (LNMO), in which Mn valence relics 4^+, because Ni ion are active with electron redox reaction ($Ni^{4+}\leftrightarrow Ni^{2+}$). So LNMO is free from Jahn- Teller distortion and disproportionation reaction. Hence LNMO provides outstanding structural stability with high working voltage (>4.6Vvs.Li/Li^+) beneficial with respect to energy density and cycle life as a cathode for LIBs.

Partial replacement of Mn in $LiMn_2O_4$ with Ni is effective approach to improve the electrochemical properties of $LiMn_2O_4$ because the bonding energy of Ni-O is stronger than Mn-O. The stronger Ni-O bond is in favor of maintaining the spinel structure during cycling. This prevents the structural disintegration of materials. In case of Ni doping, the ionic radius of 0.64A°, which is nearly the same as that of Mn^{4+} (0.54A°) , so Ni can substitute for Mn in $LiMn_{1.5}Ni_{0.5}O_4$.The strong Ni-O bond is beneficial to improve electrochemical properties of $LiMn_2O_4$. Cation doping (like Ni) can improve conductivity, enlarge lattice constants and form stronger M-O bond, etc., which are favorable for the migration of lithium ions and maintaining stable crystal structure. Better electrochemical properties can be expected by choosing appropriate elements and amount. The advantage of $LiMn_{1.5}Ni_{0.5}O_4$ has better structural stability superior to the un -doped manganese spinel ($LiMn_2O_4$).

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Synthesis And Charecterization Of $LiMn_{1.5}Ni_{0.5}O_4$ By Sol-Gel Method For Cathode Material & It's Application In Li-Ion Battery

Subhashini Vedala[1*], M. Sushama[2], M. Aruna Bharathi[3]

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Partial replacement of Mn in $LiMn_2O_4$ with Ni is effective approach to improve the electrochemical properties of $LiMn_2O_4$ because the bonding energy of Ni-O is stronger than Mn-O. The stronger Ni-O bond is in favor of maintaining the spinel structure during cycling. This prevents the structural disintegration of materials. In case of Ni doping, the ionic radius of 0.64A°, which is nearly the same as that of Mn^{4+} (0.54A°) , so Ni can substitute for Mn in $LiMn_{1.5}Ni_{0.5}O_4$.The strong Ni-O bond is beneficial to improve electrochemical properties of $LiMn_2O_4$. Cation doping (like Ni) can improve conductivity, enlarge lattice constants and form stronger M-O bond, etc., which are favorable for the migration of lithium ions and maintaining stable crystal structure. Better electrochemical properties can be expected by choosing appropriate elements and amount. The advantage of $LiMn_{1.5}Ni_{0.5}O_4$ has better structural stability superior to the un -doped manganese spinel ($LiMn_2O_4$).

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A-GRADE

PROCEEDING OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/EEE/05

Date:22/07/2019

Subject: Award of the project titled **"Introducing Pulsatile flow through BLDC motor control for Ventricular Assist Devices"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

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ORDERS:

The project titled **"Introducing Pulsatile flow through BLDC motor control for Ventricular Assist Devices"** is awarded with sanctioned amount of Rs **2,50,000/-** (Rupees two lakhs and fifty thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1. Principal Investigator : **Dr. Anil Kumar Puppala**
   Department Name : Electrical and Electronics Engineering
   Institute Name : Geethanjali College of Engineering & Technology.

2. Co-Principal Investigator-1 : **Dr. Venkateshwarlu S.**
   Department Name : Electrical and Electronics Engineering
   Institute Name : CVR College of Engineering.

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

PRINCIPAL
Geethanjali College of Engg. & Tech.
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A-GRADE

OFFICE OF THE TEQIP - III
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **Dr. Anil Kumar Puppala**, Geethanjali College of Engineering & Technology
2. **Dr. Venkateshwarlu S**, CVR College of Engineering

With Procs **No.JNTUH/TEQIP-III/CRS/2019/EEE/05** dated on **22-07-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed 30-03-2021. Out of the sanctioned amount of Rs **2,49,493**/-, utilized (including Interest) amount is Rs **2,49,493**/- and unspent amount for Rs **NIL** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

31/3/21

REGISTRAR

PRINCIPAL
Geethanjali College of Engg. and Tech.
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PROCEEDING OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/EEE/07 Date:22/07/2019

Subject: Award of the project titled **"Deep learning based Smart Assistant for blind People"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

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ORDERS:

The project titled **"Deep learning based Smart Assistant for blind People"** is awarded with sanctioned amount of Rs.**2,70,000/-** (Rupees two lakhs and seventy thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	:	**Dr. Rashmi Kapoor**
	Department Name	:	Electrical and Electronics Engineering
	Institute Name	:	VNR Vignana Jyothi Institute of Engineering & Technology.
2.	Co-Principal Investigator-1	:	**Dr. M. Sushama**
	Department Name	:	Electrical and Electronics Engineering
	Institute Name	:	JNTUH College of Engineering Hyderabad.
3.	Co-Principal Investigator-2	:	**Dr.M. Aruna Bharathi**
	Department Name	:	Electrical and Electronics Engineering
	Institute Name	:	Geethanjali College of Engineering & Technology.

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

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11. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
12. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till the completion of TEQIP-III Project
13. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
14. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
15. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
16. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
17. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
18. For any discrepancies and other relevant matters, decision of the University is final.
19. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so; it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals,
Copy to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

PRINCIPAL
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OFFICE OF THE TEQIP - III
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **Dr. Rashmi Kapoor**, VNR Vignana Jyothi Institute of Engineering & Technology
2. **Dr. M. Sushama**, JNTUH College of Engineering Hyderabad
3. **Dr.M. Aruna Bharathi**, Geethanjali College of Engineering & Technology

With Procs **No.JNTUH/TEQIP-III/CRS/2019/EEE/07** dated on **22-07-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed 30-03-2021. Out of the sanctioned amount of Rs **2,47,462/-**, utilized (including Interest) amount is Rs **2,47,462/-** and unspent amount for Rs **NIL** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

REGISTRAR

PRINCIPAL
Geethanjali College of Engg. and Tech.
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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
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Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/CSE/07 Date:22/07/2019

Subject: Award of the project titled **"Machine Learning Approach For Plant Disease Identification using Leaf Images"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

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ORDERS:

The project titled **"Machine Learning Approach For Plant Disease Identification using Leaf Images"** is awarded with sanctioned amount of Rs Rs.**2,95,000/-** (Rupees Two Lakh Ninety Five Thousand Only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	**Dr. Ch. Ramesh Babu**
	Department Name	Computer Science and Engineering
	Institute Name	Geethanjali College of Engineering & Technology
2.	Co-Principal Investigator-1	**Dr. Dammavalam Srinivasa Rao**
	Department Name	Information Technology
	Institute Name	VNR Vignana Jyothi Institute of Engineering & Technology
3.	Co-Principal Investigator-2	**V.Sravan Kiran**
	Department Name	Information Technology
	Institute Name	St.Martin's Engineering College

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

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11. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
12. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till the completion of TEQIP-III Project
13. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
14. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
15. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
16. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
17. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
18. For any discrepancies and other relevant matters, decision of the University is final.
19. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so; it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals,
Copy to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

PRINCIPAL
Geethanjali College of Engg. and Tech.
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Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/ Chemistry/04 Date:25/09/2019

Subject: Award of the project titled **"A facile synthesis and anticancer activity of novel quinoxaline-2-carbohydrazide N-oxide derivatives."** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 17.09.2019

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ORDERS:

The project titled **"A facile synthesis and anticancer activity of novel quinoxaline-2-carbohydrazide N-oxide derivatives."** is awarded with sanctioned amount of Rs.**2,50,000/-** (Rupees Two lakhs fifty thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	:	**Dr.K.Shashikala**
	Department Name	:	Chemistry
	Institute Name	:	Geethanjali College of Engineering & Technology
2.	Co-Principal Investigator-1	:	**Dr.T. Thirumala Chary**
	Department Name	:	Chemistry
	Institute Name	:	JNTUH College of Engineering Hyderabad
3.	Co-Principal Investigator-2	:	**Dr.S.Srilatha**
	Department Name	:	Chemistry
	Institute Name	:	ACE Engineering College

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. A joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
5. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
6. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
7. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
8. The Second Installment of Rs.50,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
9. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.
10. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
11. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till

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12. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
13. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
14. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
15. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
16. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
17. For any discrepancies and other relevant matters, decision of the University is final.
18. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution in three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so, it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals of lead Institute

Copy to PA to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

PRINCIPAL
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OFFICE OF THE TEQIP - III
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **Dr.K.Shashikala**, Geethanjali College of Engineering & Technology
2. **Dr.T. Thirumala Chary**, JNTUH College of Engineering Hyderabad

With **Procs No.JNTUH/TEQIP-III/CRS/2019/Chemistry/04** dated on **24-09-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed 31-03-2021. Out of the sanctioned amount of Rs **2,50,000/-**, utilized (including Interest) amount is Rs **2,51,379 /-** and unspent amount for Rs **60/-** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

REGISTRAR

PRINCIPAL
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Kukatpally, Hyderabad – 500 085, Telangana (India)
PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/ Mathematics/04 Date: 25/09/2019

Subject: Award of the project titled "**Peristaltic Transport of Nanofluids**" under Collaborative Research Scheme TEQIP-III, JNTUH

Read: Note order of the Vice-Chancellor dated 17/09/2019

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ORDERS:

The project titled "**Peristaltic Transport of Nanofluids**" is awarded with sanctioned amount of Rs.**2,00,000**/- (Rupees Two lakhs only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	:	**Dr. N.Subadra**
	Department Name	:	Mathematics
	Institute Name	:	Geethanjali College of Engineering & Technology
2.	Co-Principal Investigator-1	:	**Dr. M.A.Srinivas**
	Department Name	:	Mathematics
	Institute Name	:	JNTUH College of Engineering Hyderabad
3.	Co-Principal Investigator-2	:	**Dr. Sunil Dutt Purohit**
	Department Name	:	Mathematics
	Institute Name	:	Rajasthan Technical University

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. A joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
5. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
6. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
7. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
8. The Second Installment of Rs.50,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
9. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.
10. The project should results in at least one publication in the relevant Journal national/international (Non Payment Journal).
11. PI's and Co-PI's will be informed if there are any directions from NPIU or changes made by TEQIP-III JNTUH relevant to Collaborative Research Scheme time to time and are to be followed in due course till the completion of TEQIP-III Project

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

12. All non-consumables procured for the research project will automatically become the property of the lead institution after completion of the project.
13. Any deviation in the expenditure as defined in the project proposal is not accepted. In such case prior permission is necessary from the university. After obtaining necessary permission, funds should be utilized as per the revised guidelines. No deviation is accepted.
14. Any interest incurred should be deposited back to the university JNTUH, TEQIP-III Account.
15. Unspent amount as per the proposal/ Guidelines of the TEQIP within the stipulated time should be deposited back to the university TEQIP account. (Along with Interest Incurred).
16. Any discrepancy with Co Investigator and principals while implementing the project to be brought to the notice of University authorities.
17. For any discrepancies and other relevant matters, decision of the University is final.
18. Upon the completion of the Project, PI should submit final report Form E, Final Financial Statement Form F, and utilization certificate Form G along with true copy of audit report of the Project. In case if principal fails to do so, it will be recovered from institute.

With the following terms conditions to the Principals:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. The grant from TEQIP-III will be transferred to Principals account of lead institution in three installments.
3. A separate account for the project may be created.
4. Principal is responsible for transfer of funds to the project account within one week after the release of funds from university. In case if principal fails to do so, it will be recovered from institute.
5. Principals should permit to use existing facilities for project Implementation if requested.
6. In case if both PI and Co-PI-1 are from affiliated institute, a joint account is to be operated by PI, Co –PI-1 and Principal of lead institution
7. In case of collaborative research project carried under twinning, PI and Principal of lead institute will jointly operate the account
8. In case either PI or Co-PI-1 withdraws from the project, Principals of the respective institution shall find the replacement and inform the same to the University for Approval.
9. A declaration form duly signed by Principal (Form H) abiding the rules listed above shall be submitted along with account details within 3 days after receiving the sanction letter for the transfer of research grant.
10. Any discrepancy with PI and Co- PI, while implementing the project, to be communicated with details, to the University.
11. After the completion of every project, Principals of lead institute should ensure that all non consumables procured for projects become the property of institution and to be labeled TEQIP-III/ (Number).
12. Principal of the lead institute should submit the list of all non consumables procured for all Projects at the end of collaborative research scheme through duly filled in Form I.
13. Principals will be informed if any directions from NPIU or changes in guidelines made by TEQIP-III JNTUH relevant to the Collaborative Research Scheme from time to time. Those guidelines should be followed in due course of time, till the completion of TEQIP-III Project
14. For any discrepancies and other relevant matters, decision of the University is final.

Under the circumstances as stated above, the Vice-Chancellor is pleased to accord permission to award the project under Collaborative Research Scheme TEQIP-III, JNTUH.

The expenditure shall be met from TEQIP-III funds.

REGISTRAR

To
The Concerned Investigators
The Concerned Principals of lead Institute

Copy to PA to VC/Rector/Registrar.
Copy to Office of the TEQIP-III

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FORM G
(Final Financial Statement)

1 Sanction letter no: Proc.No. TSCHE/TEQIP III/ RS/2019/Mathematics/04

2 Total Project Cost: Rs. 2,00,000

Sanction Revised Project cost (if applicable): Rs. 2,00,000

3 Date of Commencement of Project: 17/09/2019

4 Date of completion of project: 28/02/2021

5 Grant revised in each year (financial)

Sl No	Sanctioned Heads	Funds Allocated (Rs.)	Balance (if any)			Remarks		
			I Installment	II Installment	III Installment	Total		
1	2	3	4	5	6	8	9	10
1	Manpower	30,000	15,000	15,000	-	30,000		
2	Non Consumables	60,000	19,967	40,033	-	60,000		
3	Consumables							
4	Travel	20,000	20,000	-	-	20,000		
5	Field Visit	20,000	6717	-	13283	20,000		
6	Overhead Expenses	40,000	10,000	-	30,000	40,000		
7	Others (if any)	30,000	7,090	20,312	806+817+3600= 5223	32,625		
8	Bank Charges				262	262		
	Total	**2,00,000**	**78,774**	**75,345**	**48,768**	**2,02,887.00**		

Amount to be refunded/ reimbursed (whichever is appropriate): Nil

Signature of the:

a) Principal Investigator:

b) Co-Investigator-I

c) Co-Investigator-II

Geethanjali College of Engineering & Technology Sy. No. 29 & 34 Cheeryal Village Keesara Mandal

Signature of the Head of the Institution with Seal

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Phone: Off +91-40-23158665
Fax: +91-40-23158665
Web www.jntuh.ac.in
E Mail: pa2registrar@jntuh.ac.in

ACCREDITED BY NAAC
A-GRADE

PROCEEDING OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PRESENT Dr. N. YADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/ECE/07 Date:22/07/2019

Subject: Award of the project titled **"Speech Enabled IVR based online market place for Farmers"** under Collaborative Research Scheme, TEQIP-III, JNTUH.

Read: Note order of the Vice-Chancellor dated 22.07.2019

***

ORDERS:

The project titled **"Speech Enabled IVR based online market place for Farmers"** is awarded with sanctioned amount Rs. **2,99,000/-** (Rupees Two Lakh Ninety Nine Thousand only) under Collaborative Research Scheme, TEQIP-III, JNTUH to the following investigators.

1.	Principal Investigator	**D. Mohan**
	Department Name	Electronics and Computer Engineering
	Institute Name	Sreenidhi Institute of Science & Technology
2.	Co-Principal Investigator-1	**Dr. K. Anitha Sheela**
	Department Name	Electronics and Communication Engineering
	Institute Name	JNTUH College of Engineering Hyderabad
3.	Co-Principal Investigator-2	**Mr. P. Sudhakar**
	Department Name	Electronics and Communication Engineering
	Institute Name	Geethanjali College of Engineering and Technology

With the following terms and conditions to the Investigators:

1. The institute where Principal Investigator is working becomes the lead Institute.
2. An Initial grant of Rs.1,00,000/- will be released to the account of the principal of lead institute.
3. In case if both PI and Co-PI-1 are from affiliating institutions, a joint account should be operated by PI, Co-PI-1 and Principal of lead institute.
4. If Co-PI-1 is from the Constituent colleges of JNTUH (JNTUHCEH, JNTUHCEJ, JNTUHCEM, JNTUHCES), PI and Co-PI will operate a Joint account and fund will be transferred for lead institute Principal account.
5. In case, PI or Co-PI leave the institute for any reason or withdraw from the project (proper justification should be communicated to the University), he/she shall be treated as withdrawn from the project.
6. PI's and Co-PI's should fill the Forms A to F and submit to TEQIP-III JNTUH whenever required.
7. PI's and Co-PI's should submit Form A within 3 days after receiving the sanction letter.
8. PI's and Co-PI's should be present at the time of first Progress evaluation after 4 months and all other subsequent Progress Evaluations (once in 4 months) conducted at TEQIP-III JNTUH.
9. The Second Installment of Rs.1,00,000 of Research grant will be released on satisfactory performance in first Progress Evaluation and submission of Form B and Form D duly filled and signed.
10. The 3rd and final installment will be released upon submission of Form C and D and satisfactory Performance in the next Progress Evaluation.

Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Phone: Off: +91–40–23158665
Fax: 191–40–23158665
Web : www.jntuh.ac.in
E Mail: jntuhteqip@jntuh.ac.in

A-GRADE

OFFICE OF THE TEQIP - III
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **D. Mohan**, Sreenidhi Institute of Science & Technology
2. **Dr. K. Anitha Sheela**, JNTUH College of Engineering Hyderabad
3. **Mr. P. Sudhakar**, Geethanjali College of Engineering and Technology

With **Procs No.JNTUH/TEQIP-III/CRS/2019/ECE/07** dated on **22-07-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed. Out of the sanctioned amount of Rs **2,99,000/-**, utilized amount (including Interest) is Rs **3,01,061/-** and unspent amount for Rs **NIL** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

18/05/21

REGISTRAR

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

Tele:
Tele Fax:

No. ERIP/ER/1504754/M/01/1719
Government of India, Ministry of Defence
Defence Research & Development Orgn.
Directorate of Extramural Research and Intellectual Property Rights
DRDO HQ Annexe
5th Floor, NTB, Metcalfe House
Delhi -110054

5th August , 2021

To

Prof S Udaya Kumar
Dept. of ECE
Geethanjali College of Engineering and Technology
Cheeryal (V), Keesara (M), Medchal Dist. (T.S.) – 501 301

Corrigendum

Sub: **PDC Extension of ER&IPR Sponsored Grant-in-Aid Project Titled** "Development of Novel Carbon Nanotube/Polymer Nanocomposite Materials for EMI Applications"

Ref: (i) Sanction Letter No. ERIP/ER/1504754/M/01/1719 dated 2nd April, 2018
(ii) PI request letter dated 29.06.2021 for PDC Extension of 08 months
(iii) Recommended by PRC Meeting held on 28th January, 2021

The competent authority has granted PDC extension **up to 19.03.2022 (08 months).**
The following amendment is made in sanction letter dated 2nd April, 2018:-
Para 3 of sanction letter dated 2nd April, 2018

FOR: "The project will last for **03 Years** from the date of release of the first installment by the PCDA (R&D) and it will be governed by the terms and conditions given overleaf"

READ: "The project will last for **03 Years & 08 Months** from the date of release of the first installment by the PCDA (R&D) and it will be governed by the terms and conditions given overleaf"

2. All other terms and conditions, as mentioned in the sanction letter no ERIP/ER/1504754/M/01/1719 dated 2nd April, 2018 remains unchanged.

(Dr Shiv Kumar)
Director, ER&IPR

Copy to:

1. The Principal, Geethanjali College of Engineering and Technology, Cheeryal (V), Keesara (M), RR District-501 301, Telangana
2. The Director, DMSRDE, DRDO, GT Road, Kanpur- 208 013
3. Sh Alok Dixit, Sc'F', DMSRDE, DRDO, GT Road, Kanpur- 208 013
4. PCDA (R&D), DRDO Cell, RK Puram, New Delhi-110 066
5. IFA (R&D), DRDO Bhawan, New Delhi-110 011
6. DGADS, L-2 Block, New Delhi- 110 001

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

AUDITED/PROVISIONAL STATEMENT OF EXPENDITURE ACCOUNTS

FOR THE FINANCIAL YEAR 2019-2020 (1-4-2019 to 31-3-2020)

(a) Title of the Project: Development of Novel carbon nanotube/polymer nanocomposite materials for EMI applications

(b) Sanctioned letter no. & date: ERIP/ER/1504754/M/01/1719, Date: 2-4-2018

(c) Principal Investigator: Prof.S. Udaya Kumar

(d) Date of Start of the Project: 20-7-2018

(e) Total Sanctioned cost of the Project :in Rs.45.81 lakh

(f) Grant received (Rs.) in **I yr**. Rs.30.39 lakh **II yr** --- **III yr** --

(g) Total Grants received so far: Rs.30.39 lakh

S. No.	Sanctioned Heads	Funds Sanctioned for the year Rs. lakh	Funds released Rs. lakh	Carried forward from Previous year Rs.	Funds available(iv+ v) Rs	Expenditure incurred during the FY Rs.	Balance (vi-vii) Rs.	Commitments Rs.	Total expenditure (vii+ix) Rs.
i	ii	iii	Iv	V	vi	vii	viii	Ix	X
(a)	Staff	3.90	--	1,53,065	1,53,065	3,90,000	-2,36,935	3,90,000	7,80,000
(b)	Equipment	--	--	9,71,159	9,71,159	9,18,500	52,659	52,659	9,71,159
(c)	Operation & Maint.	--	--	--	--	--	--	---	---
(d)	Expendables	2.50	--	1,18,815	1,18,815	96,860	21,955	2,71,955	3,68,815
(e)	Travel	0.50	--	41,974	41,974	29,828	12,146	62,146	91,974
(f)	Contingencies	0.40	--	30,879	30,879	46,895	-16,016	56,016	1,02,911
(g)	Research Consultant	0.29	--	29,000	29,000	--	29,000	29,000	29,000
(h)	Procured Service	--	--	--	--	--	--	--	--
	Institutional over head	0.39	--	70,273	70,273	70,273	--	39,000	84,273
	Interest earned, (during 1/4/2018 to 31/03/2019)		-	44,641	44,641	80,575(Interest from 20/7/2018 to 31/10/2019 Refunded to CDA (R&D) Vide cheque no 499507,Date 27/11/2019)	8,958	8,958	89,533
	Interest earned during 1/4/2019 to 31/03/2020				44,892				
	TOTAL	7.98	--	14,59,806	15,04,698	16,32,931	-1.28,233	9,09,734	25,17,665

S. Udaya Kumar

Name and Signature of Principal Investigator
Date:

B. MALLESWARA

Name and Signature of Accounts Officer
Date

Signature of Administrative Authority
PRINCIPAL
Geethanjali College of Engg. and Tech.

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.

UTILIZATION CERTIFICATE

FY 2019-2020 (From 1-4-2019 to 31-3-2020)

Certified that sum of Rs.30.39 lakh was sanctioned as grants-in-aid during the Year 2018-2019 in favour of Geethanjali College of Engineering and Technology. Instt) vide DRDO letter No. ERIP/ER/1504754/M/01/1719 dated 2-4-2018. A sum of Rs. 30.39 lakh released vide Letter No. ERIP/ER/1504754/M/01/1719 dated 26-7-2018, an amount of Rs. 44,892 /- accrued as interest (if any) during the year and Rs. 14,59,806./- on account of unspent balance of the previous year, a sum of Rs. 16,32,931. /- has been utilized for the purpose of which it was sanctioned and that the balance of Rs. -1,28,233 /- (to be paid) at the end of the year shall be adjusted towards the grants-in-aid payable during the year i.e. 2020-21

Principal Investigator | Accounts/Finance Officer | Administrative Authority (with official seal)

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), R.R.Dist. (A.P.)-501 301.

2. Certified that I have satisfied myself that the conditions on which the grants- in-aid was sanctioned have been fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

UDIN: 20022361AAAAC5458

For HARI BABU & ASSOCIATES
CHARTERED ACCOUNTANTS
Firm Regn. No. 001064S

7/8/2020

(Ch. HARI BABU) Partner
M. No. 022361

Signature of Audit Authority of Grantee Institution

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

GCET/113/2019-20, Dt. 12-03-2020

SPEED POST

सूक्ष्मतरंग नलिका अनुसंधान तथा विकास केन्द्र
पी ओ बाक्स -1310, जालहल्ली पोस्ट, बेंगलूरू - 560013, कर्नाटक, भारत

Microwave Tube Research and Development Centre (MTRDC)
P.O. Box No.1310, Jalahalli P.O., Bengalooru -560 013, Karnataka, India

EPABX : 28382402 / 1155 / 6807 / 0388 Telefax : 080-28386809 Fax : 080-28386809 / 1750 / 6804
Grams : DEFMICROTUBE Web : www.drdo.org E-mail : mmg@mtrdc.drdo.in

रक्षा अनुसंधान तथा विकास संगठन, रक्षा मंत्रालय, भारत सरकार Defence Research & Development Organisation, Ministry of Defence, Government of India

No. MTRDC/MMG/17111/LPO/134/2018-19/BUP **Date:** 05 **Mar, 2020**

To,

M/s. Geethanjali College of Engineering and technology
Sy No.33 & 34, Cheeryal (V),
Keesara (M),
Medchal District,
Telangana – 501 301

(Kind Attn. Prof. Dr. S. UDAYA KUMAR)

SUBJECT: PAYMENT DOCUMENTS IN R/O CARD CONTRACT ON "DESIGN AND SOLENOID MAGNET SYSTEMS FOR BACKWARD WAVE OSCILLATOR"

Reference: Your letter dated: 24.02.2020

1. With reference to your above said letter, the Invoice is not enclosed along with the contractor's bill and other documents. Payment cannot be processed without the Invoice. Also, please attach ECS, PAN card & cancelled Cheque
2. Kindly forward the same at the earliest.

(S VIJAY MAHENDRA)
STORES OFFICER
FOR DIRECTOR

To
Dr. R.S. Raju
13/03

ISO 9001: 2000 Certified

कृपया सदैव उत्तर देते समय हमारी पत्र संख्या तथा दिनांक लिखे। यह आपके पत्र संचार के उत्तर देने में अधिक सहायता देगी।
Kindly always quote our letter number and date while replying. This will immensely assist prompt attention to your communication.

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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सूक्ष्मतरंग नलिका अनुसंधान तथा विकास केन्द्र

बी.ई.एल. कांप्लेक्स,जालहल्ली, बेंगलूरु –560013

Microwave Tube Research and Development Centre

BEL Complex, Jalahalli, Bangalore-560013, Karnataka

EPABX: 28380388/28382402 **Fax**: 28381750/28386804/28386809 **Web**: http://drdo.gov

रक्षा अनुसंधान तथा विकास संगठन,रक्षा मंत्रालय, भारत सरकार Defence Research & Development Organization, Ministry of Defence, Government of India

Letter No: MTRDC/10731/CARS/01

Date: 25/08/2020

To
The principal
Geethanjali College of Engineering and Technology
Cheeryal (V), Medchal (D), Telangana

Subject: Letter of completion of project

Dear Sir

We are glad to state that the involvement of your college in the "Design and development of solenoid magnet for BWO" CARA project strengthen our R&D activity on our development program of BWO.We appreciate your design work, which is to our satisfaction .we hope to see your further involvement in future to support our R&D work through a suitable programme.

Dr.S.Uma Maheswara Reddy
OS & Director

EPABX: 28380388, 28381155, 28382402, 28386807 Fax: 080-28381750/28386804/28386809
Web:www.drdo.org E-mail: director@mtrdc.drdo.in

ISO 9001 : 2008

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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TEJA EDUCATIONAL SOCIETY(GCET)

Sub-Ledger DRDO Sponsored Project-MTRDC(CARS) 01-04-2019 To 31-03-2020

Date	Voucher	Cheq. No	Branch	Account	Debit	Credit	Balance	Narration
Number	R.no	Amount	Amount					
DRDO Sponsored Project-MTRDC(CARS)								
				Opening Balance	135,400.00		135400.00Dr	
04-22-2019	Pmt:230	142485	ECE	SBI Bank -a/c(PGCET-62079625817	4,000.00		139400.00Dr	Towards Paid to Dr.K.Sai Krishna for MTRDC Project Guest Honarar
04-30-2019	Jrn:35			Salaries Account	31,000.00		170400.00Dr	Towards Staff Salaries payble for the Month of APRIL'19
05-09-2019	Pmt:502	142529	ECE	SBI Bank -a/c(PGCET-62079625817	2,000.00		172400.00Dr	Towards Paid to Sourabh Joshi for MTRDC Project Guest Honarar
05-17-2019	Rct:205	TR		SBI Bank -a/c(PGCET-62079625817)		145,314.00	27086.00Dr	BULK POSTING CDA RANDD BENGALURU000024
05-31-2019	Jrn:117			Salaries Account	31,000.00		58086.00Dr	Towards Staff Salaries payble for the Month of MAY'19
05-31-2019	Jrn:1219			TDS/TCS Receivable		16,146.00	41940.00Dr	Twrds tds receivable on amt 161460/-from CDA-Bangalore
06-20-2019	Pmt:907	225253	ECE	SBI Bank -a/c(PGCET-62079625817	3,000.00		44940.00Dr	Towards Paid to J.Janardhana Reddy for MTRDC Project Guest Honar
06-20-2019	Pmt:909	225254	ECE	SBI Bank -a/c(PGCET-62079625817	3,000.00		47940.00Dr	Towards Paid to Ajit Raymond James for MTRDC Project Guest Honar
06-30-2019	Jrn:187			Salaries Account	31,000.00		78940.00Dr	Towards Staff Salaries payble for the Month of JUNE'19
07-15-2019	Pmt:1249	225306		SBI Bank -a/c(PGCET-62079625817	2,279.00		81219.00Dr	TOwards Paid to Dr.RS Raju for MTRDSC Project Work Travelling Ex
07-31-2019	Jrn:263			Salaries Account	31,000.00		112219.00Dr	Towards Staff Salaries payble for the Month of JUIY'19
08-08-2019	Pmt:1537	056415		SBI Bank -a/c(PGCET-62079625817	7,158.00		119377.00Dr	Towards Paid for MTRDC Project Purpose Misc Exp Pur (RS RAJU
08-31-2019	Jrn:348			Salaries Account	31,000.00		150377.00Dr	Towards Staff Salaries payble for the Month of AUGUST'19
09-04-2019	Pmt:1805		ECE	Main Cash Book	1,746.00		152123.00Dr	Towards Paid for Pur.of MTRDC Project Misc Exp
09-27-2019	Jrn:433			S.V.Electronics Ltd	1,500.00		153623.00Dr	Towards Inv No:C15-2772 & C15-2740
09-27-2019	Jrn:433			S.V.Electronics Ltd	6,000.00		159623.00Dr	Towards Inv No:C15-2772 & C15-2740
09-30-2019	Jrn:430			Salaries Account	31,000.00		190623.00Dr	Towards Staff Salaries payble for the Month of SEPTEMBER'19
10-31-2019	Jrn:521			Salaries Account	31,000.00		221623.00Dr	Towards Staff Salaries payble for the Month of OCTOBER'19
11-18-2019	Pmt:2656			Main Cash Book	2,969.00		224592.00Dr	Towards paid for R&D MTRDC Project Purpose Misc Exp
11-18-2019	Pmt:2659			Main Cash Book	1,200.00		225792.00Dr	Towards paid for R&D MTRDC Project Purpose Misc Exp
11-30-2019	Jrn:629			Salaries Account	31,000.00		256792.00Dr	Towards Paid for DRDO (R&D) & MTRDC JRF Salary Month of Nov'19
12-31-2019	Jrn:764			Salaries Account	31,000.00		287792.00Dr	Towards Paid for DRDO (R&D) & MTRDC JRF Salary Month of Dec'19
01-31-2020	Jrn:917			Salaries Account	31,000.00		318792.00Dr	Towards Paid for DRDO (R&D) & MTRDC JRF Salary Month of Jan'202
03-02-2020	Rct:3496	TR		SBI Bank -a/c(PGCET-62079625817)		217,971.00	100821.00Dr	BULK POSTING CDA RANDD BENGALURU000024
03-30-2020	Rct:3649	NEFT		SBI Bank -a/c(PGCET-62079625817)		264,285.00	163464.00Cr	BULK POSTING - CDA RANDD BENGALURU000024
03-31-2020	Jrn:1220			TDS/TCS Receivable		29,365.00	192829.00Cr	Twrds tds receivable on amt 293650/-from CDA-Bangalore
03-31-2020	Jrn:1221			TDS/TCS Receivable		24,219.00	217048.00Cr	Twrds tds receivable on amt 242190/-from CDA-Bangalore
		Total (Rup			480,252.00	697,300.00		

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Compressed Data Aggregation and Routing in WSN using Optimal Clustering Protocol

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Abstract: There is a difference in energy consumption among the nodes in cluster-based wireless sensor networks due to the non-uniform distribution of nodes. Based on this issue, we are proposing an efficient data aggregation tree based on the previous clustering architecture for communication and routing. Here, using fuzzy logic methodology, parameters such as Residual Power, Node Density and Load cluster heads are chosen. The inter-cluster routing algorithm balances the energy consumption between the heads of the cluster by changing energy consumption between clusters. Then data compression is applied using data correlation model to reduce energy consumption.

Keywords: wireless sensor network; fuzzy logic; inter-cluster routing algorithm; energy consumption.

1. Introduction

1.1 Wireless Sensor Networks (WSN)

Wireless Sensor Networks (WSN) consists of intelligent, teensy sensor nodes capable of sensing different types of phenomenon using sensor modules and wirelessly transmitting the specific data to a sink node. WSNs gather and measure all data and provide specific users with different sensing information. Typically, these sensor nodes are installed in huge proportions (from a few to thousands) and in environments where human control is exceedingly difficult. Sensors must therefore be spread randomly and must use limited power storage units such as batteries. Sensor nodes therefore need to work with each other to create a self-organized network, and they need to be fitted with energy-efficient modules and protocols to reduce energy consumption and ensure long life of the network [1].

One of WSN's important tasks is to collect and relay the relevant parameters to the base station. Sensors are typically deployed in a dangerous atmosphere and battery replacement is difficult, making energy usage one of the most important considerations of protocol design. In WSN, sensors share information to each other through wireless signal and all neighbors receive the data transmitted by a sensor, thus the overhead communication is the large energy wastage of the sensor. Data aggregation is among the most effective ways of reducing overhead communication and many schemes for eliminating redundant transmissions have been proposed [2,3].

A sensor network consists of a lot of of sensors with capabilities in computing, communication, and sensing that can spread across a geographical region. Their restricted processing power, range and storage space limits the use of standard data processing algorithms and the amount of intermediate results that can be deposited on the sensor nodes. Thus, well-organized routing in WSNs is needed for the easiest way of compressed data aggregation [4,5].

1.2. Aggregation of cluster-based data in WSN

In the wireless sensor region data aggregation is an important technique because data packet reduction can reduce energy consumption, increase network life, and increase the effective data transmission ratio. The principle of clustering can be used to increase the efficiency of data aggregation in a hierarchical network in terms of target monitoring. Static clustering and the other dynamic clustering are the two types of clustering methods.

Fuzzy K-means clustering with fast density peak clustering on multivariate kernel estimator with evolutionary multimodal optimization clusters on a large dataset

G. Surya Narayana & Kamakshaiah Kolli

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Fuzzy K-means clustering with fast density peak clustering on multivariate kernel estimator with evolutionary multimodal optimization clusters on a large dataset

G. Surya Narayana[1] · Kamakshaiah Kolli[2]

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Abstract
Many conventional optimization approaches concentrate more on addressing only one appropriate solution. Thus, these methods were to be utilized often, hence there were no chances of producing the intended solution. Therefore, the issue of multimodal optimization has to be considered. So, to reduce the difficulties by the clustering and further, it followed by the optimization technique. Here, the variety of real-time and artificial techniques are used. Using the FCDP-Fast Clustering with Density Peak, we calculate the density values after determining the center with the help of objective function. Then, the fuzzy clustering is applied to form the clustered groups with the density and center values. Finally, we optimize the data using the CDE-Crowding Differential Evaluation methodology. Performance analysis is then proceeded with some existing methods by using the performance metrics like NMI and ARI. After validation, it concluded that the proposed method was superior to the existing method.

Keywords K-means clustering · Multimodal optimization · Crowding differential evaluation · Density value · Center distance

1 Introduction

Being the age of internet dominances and rapid technological advancements, we must be safe and sound so that we could escape from the intruders and spammers in the surroundings. So data

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SMART HOME SECURITY ENVIRONMENT SYSTEM ENVIRONMENT WITH HUMAN FACE RECOGNITION BY USING REMOTE TECHNOLOGY

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Abstract: Smart home security system has become indispensable in daily life. Remote monitoring technologies are to be used since the invention of smart home security control system. In this paper, we described home environmental issues to authenticate people by the verification of wireless control system. We proposed verification techniques for the identification of visitors' faces, alert messages of home environment situations. System control issues can be authorized the system through user mobiles by receiving the commands with authentication. The complete system is controlled by using Raspberry Pi and testing the home environment.This new system can be implemented in the home environment to do authentication process. Normally Face recognition algorithms and wireless interfaces are used to identify the visitors and provide an email notification and/or an alert message about the current home environment through network facilities with the help of home owner's mobile phones. This system is more useful for more applications which are not having a physical presence at any time.

Keywords: Face detection, Raspberry pi, E-mail, Security.

1. INTRODUCTION:

Now a days, Internet of Things (IoT) is an emerging area in an IT field. It is a network connection with physical objects which are accessible through the internet facilities. Yet things assign an IP address and collect the data transfer through network without human beings of participation. It provides different ways to increase efficiency and improving safety and it security [1]. Data analytics, security issues have improved the performance to achieve the best results. An efficient embedded door access control management techniques are used in face recognition process. It plays a crucial role in the security application. In those days implementation of security system was implemented in homes and workplaces [2]. Doors are open/close with the cards, security keys. It has the following advantages.

- Small surveillance capacity.
- Low efficiency in evaluating time.
- Human error in high security system.

Recent days, security gains are real high power of everything in the universe. In this paper, the authors have been focused for producing the comprehensive study, which is related to the many door locks and gate security systems that are mainly implemented [3].Customer can access the system by utilizing mobile phones [10].Previously some of the authors are focused on security issues. Krishna Reddy et al have focused on security issues in a cloud environment.[16]. Titupathy Reddy et al gives data sharing process by using secret keys.[17].Swapna et al described the website security threats[18]. Ravindra Nath etalhave been focused on different security issuses for data in cloud environment {19, 20, 21]. Jabbertal [22] provide a health care management system of government. Lakshmi Praneetha et al [23] demonstrate the automated leaf disease detection in corn species through image analysis. Mishraetal [24] gives performance analysis on architecture issues. Nagendrama [25] provides the Performance evaluation of wide area network issues. The major contribution of the paper is to provide the guidance to the users for improving door security of personal locations by using face detection and verification [1]. This system can be used to develop

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ORIGINAL ARTICLE

Visualization and quantification of aggregate and fiber in self-compacting concrete using computed tomography for wedge splitting test

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Received: 7 March 2020 / Revised: 26 September 2020 / Accepted: 14 October 2020

Abstract

Wedge splitting test gained popularity as a stable and simple method to predict the fracture mechanism properties of concrete specimens. The present research focuses on understanding the behavior of self-compacting concrete specimens made with and without steel fibers tested using wedge splitting test, later scanned under high resolution computed tomography. The contribution of hooked end steel fiber and coarse aggregates in fiber reinforced specimens was compared without steel fiber reinforced concrete specimens using high resolution computed tomography. As fracture takes place across the plane perpendicular to the splitting force, i.e. along the depth of specimens. High resolution computed tomography technique was adopted in visualizing the changes taking place across the matrix, coarse aggregate and steel fibers, along with the specimen's depth. Datasets of the images, obtained from computed tomography, after images analysis and volume reconstruction, revealed a higher coarse aggregate and steel fiber participation in the failure region of without and with fibers specimens. Computed tomography investigation indicated a total of 23 coarse aggregate and 64 steel fibers participated in resisting the failure, during wedge splitting test of without and with fibers specimens. Therefore, high resolution computed tomography can be used in understanding, quantifying the participation of coarse aggregate and steel fiber in the failure plane, under fracture loads.

Keywords Wedge splitting test · Computed tomography · Self-compacting concrete · Image analysis · Fracture mechanism

1 Introduction

Dearth of free space for construction, led to a spike in land rate. To accommodate the spike in land rates, affordable for people in general, infrastructures projects are built vertically. A civil engineer needs to design such infrastructure projects, with a superior design that require structural members to be slender. In making the designing of such slender sections a reality, usage of superior engineering materials can't be ignored. These slender sections are reinforced with more number of closely placed steel bars, and then concrete is forced to pass through these reinforcement. The limitation of conventional concrete to access such inaccessible areas without external vibrations is questionable, without forgoing its homogeneity and mechanical properties. Such limitations were solved by self-compacting concrete (SCC) designed by Okamura [1] and later developed by several researchers, incorporating mineral admixtures, fibers and recycled aggregates etc. to enhance mechanical properties and durability. SCC mixes have higher finer particle concentrations, resulting in a highly workable and rich interfacial transition zone (ITZ) interface in harder concrete, relative to conventional concrete [2–4]. Failure mechanisms taking place in concrete are often influenced by the material properties and their proportions adopted during the mix design [5–8], for which SCC is no exception. Since SCC is heterogeneous and quasi brittle material with multiple phases characterisation similar to conventional concrete.

Inherently SCC specimens have cracks or fissures due to heat of hydration, shrinkage cracks etc. at several

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STRENGTH PROPERTIES OF FRC USING GLASS FIBRE AND POLYPROPYLENE

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Abstract:

Concrete is one of the primary materials in a variety of studies in the building industry. In order to increase its properties such as workability, strength, durability and other applications, as well as to reduce production costs, alternatives in concrete are also required in civil technology. Containing the fibrous content, fiber-reinforced concrete (FRC) increases the structural strength of this material. It comprises small, equal sized and randomly-oriented discrete fibres. Fibers include steel, glass fibres, synthetic and natural fibres, each with a range of properties. Furthermore, fiber-reinforced concrete change characteristics with various concretes, fibre materials, geometry, distribution, orientation and permeability. In shotcrete, fibre-reinforcement is used especially but can also be used in regular concrete. Normal fibre reinforced concrete is used mainly for ground floors and floors but can be used for a wide variety of construction sections.

Key words: natural fibres, fiber-reinforced concrete (FRC), polypropylene

1.0 INTRODUCTION

Concrete is the most commonly used construction material in the world. Beta processing includes materials such as cement, fine aggregates, rough aggregates, water and admixtures. The use of concrete grows more rapidly due to infrastructure growth and construction activities. However, the effects on concrete production are negative: continuous mining of aggregates from natural resources, ecological imbalances and deterioration of the environment are responsible. In the construction sector this environmental reason has caused much problem. Since ancient times, fibres have been used for concrete strengthening, although the technology has considerably advanced as is the case in other regions. Stroke and morter were used in early age for manufacturing mud bricks and horsehair for strengthening them. With the advent of fibre technology, cement was improved in the early 20th siècle by asbestos fibres. In the mid-20th century substantial study has been underway into the use of concrete reinforcement composites.

2.0 LITERATURE REVIEW

Containing synthetic fibers, fiber-reinforced concrete (FRC) enhances structural integrity. It comprises small, uniformly distributed and randomly oriented discrete fibres. The fibres include steel and glass fibres, synthetic and natural fibres, each of which has different characteristics.

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Behaviour Of Pedestrians At Mid-Block While Crossing The Road And Recommendations For Providing Exclusive Pedestrian Phase (Epp)At Those Locations.

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Abstract: Pedestrian crossing and the behavior of pedestrians in different conditions especially at uncontrolled crossings is a subject which needs in depth study and analysis. At uncontrolled junctions, the pedestrians and their behavior, safety of pedestrian crossing is neglected and no measures are taken to systematize pedestrian crossings at these junctions. Therefore a practical study of the pedestrian road crossing data is made in this study and statistical analysis of the data is done at uncontrolled crossing junctions in mixed traffic conditions of Indian scenario. The main objective of study is to analyze the pedestrian road crossing behavior at uncontrolled junctions. Adopting multiple regression technique the various parameters which effect the behavior of pedestrian. Vehicular gap, driver yielding behavior, frequency of attempts to cross, age and condition of pedestrian , rolling gap are some of the parameters that decide the pedestrian crossing time and other requirements. The surveys have been conducted at all junctions between Bowenpally to Kompally on national highway manually and analysis is made. The survey and statistical analysis concluded that at almost all junctions, the vehicular gaps and pedestrians behavior is not up to mark and the parameters considered indicate there is scope of accidents if suitable measures are not taken. It is concluded that counselling pedestrians and drivers for change of their behavior is very important. Providing visible marks for pedestrian crossing is to be done at all junctions. Traffic control devices are to be installed where ever possible. Considering the volume of pedestrian traffic all along the city, safe crossings for pedestrians has to be given.

Key words:*PedestrianCrossing-speed, Gap-acceptance, Delay, Safety, Mid-block crossing*

I. INTRODUCTION

A person walking on road is called pedestrian. They are required to cross the roads to go to other side. Foot paths and crossing facilities like Zebra crossings, foot over bridges are to be provided for them, to safe guard their lives and make them move safely without any fear, or hurdle to their destinations. It is responsibility of the Government and authorities to ensure their safety. On their behalf, the drivers

Camparative Study Of Partial Replacment Of Cement With Ceramic Powder For M30 Concrete

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Abstract: The cost of construction material is rising mainly due to high demand of concrete and scarcity of raw material affecting the economy of the structure. With increasing demand and consumption of cement, researchers and civil engineers are in search of developing alternate binders that are eco-friendly and contribute towards waste management. In such case, the use of industrial and agricultural waste produced by industrial processes has been the focus of waste reduction research for economic and environmental. In ceramic industry, about 15%-30% production goes as waste. These wastes create a problem in present-day society, requiring a suitable form of management in order to achieve sustainable development. The use of the waste materials in cement, concrete and other construction materials has numerous indirect benefits such as reducing the cost of concrete manufacturing, protecting environment from possible pollution effect. It may also result in foreign exchange earnings. In this study, the properties of concrete enhanced with partially replacement of Ceramic powder in the ratio of 0%, 5%, 10% and 15% by weight of cement in concrete were studied for M 30 grade. The properties for fresh concrete are tested like slump cone test and for hardened concrete compressive strength and split-tensile strength at the age of 7, 28 and 56 days curing period and durability properties are also considered. The aim behind the use of Ceramic Powder as partial replacement in the concrete is to reduce the cost of material and as an eco-friendly structure.

Keywords: cement, M 30 grade, waste reduction

Introduction:

In ancient period, the structures are made from naturally occurring gaps formed between mountains and hills generally known as caves. As the time passes, with increasing population the number of caves occupied is increased. So as to protect the nature, construction of structures has been started. Initially buildings are constructed with the available local materials such as the stones, mud and lime. Later, as the technology improved stones were used in the foundation and the superstructure was constructed with the bricks made of lime and concrete

Ceramics:

Ceramics are special materials with many applications in almost all the engineering disciplines. But their importance has often been underestimated due to the fact that many people believe that ceramics are all about pottery and tiles. Today's ceramics industry is one of most rapidly advancing concerns in many parts of the world. Ceramic industry began to expand as a modern industry with the attribution of new techniques and knowledge gained in the 1970s. Since then it has also been one of most competitive industries in the market.

Uses of Ceramic Powder

Ceramic powder improves durability against freeze-thaw action due to possibility of much better controlled porosity. Ceramic powder also improves durability against chemical (chloride, sulphate) attacks. It has high elastic stiffness, compressive strength, split-tensile strength and modulus of rupture. Ceramic powder has highdimensional stability in certain glass ceramics, resulting in reduction in thermal cracking related to temperature cycling. Ceramic powder also possesses higher temperature resistance, which may be useful to prevent heat balls, such as due to hot jet exhaust on airfields pavements from vertical take-off / landingaircrafts.

Aim of the Study:

The present study deals with the partial replacement of ceramic powder for M 30 grade of concrete.
The aims of the study are:

- To understand the utilization of Ceramic powder and its effect in concrete.

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Stabilization of Structures in Seismic Areas Subjected to Different Ground Motions

RAMACHANDER DAMERA , DR.ILANGO THANIARAS

Abstract: Structures with seismic damage with various ground motions are playing a vital role in some areas of research due to the increase in metropolitan culture which is getting developed in the world. In our present paper we are enhancing and focusing on the structural damage with some structural damages that are occurring due earth quakes which can develop with ground motion intensity, structural performance and optimal intensity which can be used for best conclusions. The research is needed for civilization which can overcome the conditions of seismic affecting risks in seismic zones of Indian Context. An investigation like the methods of structural stability after an earth quake in developing the earthquake monitoring system vibration control ability of the structures is focused in this paper.

Index terms : Seismic analysis, analysis of structure.

I.INTRODUCTION:

The Seismic waves are described as the waves of energy which can travel through the layer of earth and alco result in tremor, blast, or a fountain of liquid magma that bestows low-recurrence acoustic vitality. The waves with proliferation speed rely upon thickness and medium with versatility. The refraction or impression in geophysics for seismic waves is utilized for examination concerning Earth's inner structure, and man-made vibrations which can consistently create the shallow research and subsurface structures.

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With some upgrading parameters the seismic plan of structures has been made in light of spring like heading which are concentrated with earth shake powers with the distinction in structures which can avoid resonation. Due to the disconnection effect of shake powers with the sliding forces which can get transmitted with some structure with some pounding. [1]Due to the ground effects that are molded at the development length with can demonstrate an apex housetop with buoy and zenith that can be surveyed. As per the data which can be loaded down with basic term and the gathered with the imperativeness of stimulate grams that are made edge expanding speed limits. [2]An investigation has been done in different methods, for instance, seismic coefficient methodology and response go procedure with non straight static system. Due to these descriptive conditions the inclination ground story which can section the structure that passes on more burden diverged from the long length portion. Growing the plot for settled height the fragment forces and solidness of the structure reduces with augmentation in the point however for settled width structures it was extending. [3, 4] Analysis is led furthermore, has found the assortments for various hurt parts which can cause strong seismic tremor having little effect reliant on the last fold with technique for structure under free vibrations. Due to this we can redesign the mistake of the sections which can be mistreated with different ground developments which are same in all stages. The direct symphonious period with some ground development can be around reenact with dissatisfaction earth shiver. [5]

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INTEGRATION OF MATERIALS USED IN ANCIENT STRUCTURES FOR PRESENT DAY CONSTRUCTION

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Abstract:
Materials used in ancient era for construction has been focused here to understand the advantages of heritage buildings life time comparison with present construction practices. Brick and mortar based constructions of ancient structures with quality assessment comparison of present day work need to be studied, as a part of it the present paper focuses on the advantages and draw backs of both present and past constructional materials. Earth based mortars were used in all over the world since ancient times in extensive range of building types. Plastering is one of the most common current applications in earth based mortars for contemporary architecture. Mortars characterization confirmed that clay mineralogy drives important plaster properties like vapour adsorption, drying shrinkage and also have significance in mechanical resistance, dry abrasion and thermal conductivity. Present work discusses on the brick based mortar addition to increase strengthening properties of walls in comparison with present methods. Lime mortars significance is also studied as a part of novel approaches with stone and mortar addition comparatives.

1. Introduction

India has a very rich historic background which is evident from various buildings, forts, temples, landscapes, objects of historic era. Many of these were constructed several hundred years ago when the Indian Civilization was at its peak. Their architecture, design and construction at the time when computers, code of practice, design guidelines, research institutions and modern construction techniques did not exist makes one to realize the wisdom and expertise of our forefathers. As on present scenarios of mortar applications study between present and past, considerable factors to follow are:

- Characterization of different period masonry materials, through maps of not homogeneous areas, i.e. areas with different type of bricks or stone blocks;
- Discovery of hidden structural elements, such as arches, columns, choirs included in the existing masonry;
- The description of the original construction techniques and typologies;
- Evaluation of structural performances through determination of damage in fractured masonries;
- The detection and classification of surface damage;
- Examination of structural vulnerability through investigation of physical/mechanical properties of mortars, stones and bricks;
- Inspection of previous refurbishment and/or maintenance techniques (injections, stitching armed joints) [1].

1.1 Aim of the study

Now the question is whether these techniques and methods are easily usable and adoptable in today's era and upcoming futuristic demand. Hence we have studied the relevance of such techniques and materials with respect to availability of material and skilled labour also the speed and cost of the development, also the main factor which is usually not considered is environmental impact. And we can definitely say that using these techniques has far more additional benefits & solution to our everyday rising problems [2].

To define a reliable interdisciplinary procedure for brick masonry identification in complex historic buildings, in order to enhance documentation, conservation and restoration issues, thereby putting into value the architectural heritage. The methodology integrates experimental data obtained through on

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A Study on Impact of Working Capital Management on Profitability: A New Dimension from Indian Top Five Cement Companies' Perspective

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Abstract

Management of working capital is considered as a "three faces' coin" with each of inventory management, debtors (debtors + receivables) management along with credit suppliers and short-term lenders management. Still there exists a big tragedy between allocation of permanent (fixed) capital and circulating (working) capital. Even from the inception to incredible operations, firms are undergoing the mismatching status of working capital with respect to operational requirements. The present study encompasses the practical guide of WCM to the small cement producing firms in India, as this study has narrated the working capital policy management of largest cement companies in India. The results revealed that, in order to be considered as biggest companies in the Cement world, the selected firms need to strengthen their working capital position to reap more profits. From the analysis, it is clear that there exist a positive relation exist between profitability and components of WCM.

Keywords: *return on capital employed (ROCE), current ratio, inventory holding period (IHP), debt collection period (DCP), debt payment period (DPP), and net working capital*

1. Introduction –

1.1 Cement Industry [1]India is the silver medalist in production of cement on the globe. Indian cement industry is catering as one of the major industry to the economy and generating employment to more than 10,00,000 people. Since its deregulation, it has attracted a huge amount of FDI from multinational investors. India has a wider scope for its development especially in infrastructure building with the assistance of cement industry. Recent growth prospects like making 98 selected smart cities will push the cement industry in an upward direction.wcm ## working capital management

1.2 Introduction – Working Capital

It is a contest between the fixed capital and working capital allocation. In general lose-lose situations mostly observed repetitively in many of the firms irrespective of the industry nature and size with failure of predicting future conditions of the firm.

Allocation of excessive working capital or conservative working capital leads to collapse of reaching objectives. Hence it is very important to become considered as a financial manager, the optimum allocations by predicting future requirements of the firm along with conditions internally and externally.

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"ANALYSIS AND OPTIMIZATION OF ENGINE CYLINDER HEAT TRANSFE THROUGH FINS OF VARYING GEOMETRY AND MATERIAL"

M. Ravi Kumar[1], Dr.P.Kumar Babu[2]

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Abstract The Engine cylinder is one of the major automobile components, which is subjected to high temperature variatio and thermal stresses. In order to cool the cylinder, fins are provided on the cylinder to increase the rate of heat transfer. I doing thermal analysis on the engine cylinder fins, it is helpful to know the heat dissipation inside the cylinder. The princip implemented in this project is to increase the heat dissipation rate by using the invisible working fluid, air. We know that, I increasing the surface area we can increase the heat dissipation rate. So designing such a large complex engine is very difficu The main purpose of using these cooling fins is to cool the engine cylinder by air. The main aim of the project is to analyze t hermal properties by varying geometry, material and thickness of cylinder fins. Parametric models of cylinder with fins ha been developed to predict the transient thermal behavior. The models are created by varying the geometry, rectangul circular and curved shaped fins and also by varying thickness of the fins. The 3D modeling software used is Pro/Enginee Thermal analysis is done on the cylinder fins to determine variation temperature distribution over time. The analysis is do using ANSYS. Transient thermal analysis determine temperatures and other thermal quantities that vary over time. Th variation of temperature distribution over time is of interest in many applications such as with cooling. The accurate therm simulation could permit critical design parameters to be identified for improved life. Presently Material used for manufacturi cylinder fin body is Aluminum Alloy 204which has thermal conductivity of 110-150W/mk. We are analyzing the cylinder fi using this material and also using Aluminum alloy 6061 and Magnesium alloy which have higher thermal conductivities.

Key words: Geometry, Fins, Material, Heat transfer, Effectiveness, Pro-E, ANSYS.

1. INTRODUCTION

Internal Combustion Engine The internal combustion engine is an engine in which the combustion of a fuel (normally fossil fuel) occurs with an oxidizer (usually air) in a combustion chamber. In an internal combustion engine, the expansion the high-temperature and -pressure gases produced by combustion applies direct force to some component of the engine, suc as pistons, turbine blades, or a nozzle. This force moves the component over a distance, generating useful mechanical energ

1.1NECESSITY OF COOLING SYSTEM IN IC ENGINES All the heat produced by the combustion of fuel in the engir cylinders is not converted into useful power at the crankshaft. A typical distribution for the fuel energy is given below: Usef work at the crank shaft is25%, Loss to the cylinders walls 30%, Loss in exhaust gases 35%, Loss in friction 10%.

1.2 LITERATURE SURVEY Heat engines generate mechanical power by extracting energy from heat flows, much as a wat wheel extracts mechanical power from a flow of mass falling through a distance. Engines are inefficient, so more heat energ enters the engine than comes out as mechanical power; the difference is waste heat which must be removed. Intern combustion engines remove waste heat through cool intake air, hot exhaust gases, and explicit engine cooling .Cooling is als needed because high temperatures damage engine materials and lubricants. Internal-combustion engines burn fuel hotter tha the melting temperature of engine materials, and hot enough to set fire to lubricants. Engine cooling removes energy fa enough to keep temperatures low .Most internal combustion engines are fluid cooled using either air (a gaseous fluid) or liquid coolant run through a heat exchanger (radiator) cooled by air. Marine engines and some stationary engines have read access to a large volume of water at a suitable temperature. The water may be used directly to cool the engine, but often ha sediment, which can clog coolant passages, or chemicals, such as salt, that can chemically damage the engine. Thus, engin coolant may be run through a heat exchanger that is cooled by the body of water, .most of liquid-cooled engines use a mixtur of water and chemicals such as antifreeze and rust inhibitors. The industry term for the antifreeze mixture is *engine coolan* Some antifreezes use no water at all, instead using a liquid with different properties, such as propylene glycol or a combinatio of propylene glycol and ethylene glycol. Most "air-cooled" engines use some liquid oil cooling, to maintain acceptabl temperatures for both critical engine parts and the oil itself. Most "liquid-cooled" engines use some air cooling, with the intak

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Experimental Anlysis Of Plasma Spray Technique With Zerconium Oxide Mixture On Ss304 Material As Thermal Barrier Coating

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Abstract: Porosity is vital in most engineering applications in plasma-spray coatings. Porosity has its strengths and demerits based on coating functionality and immediate working conditions. A thorough analysis of pore as is carried out in this work on plasma sprayed coatings. The formation and growth of porosity on plasma sprayed coatings is controlled by defined parameters of spray. Optimized parameters for set spraying were employed to produce the desired coatings with minimal defects. Problems such as porosity are still present with advanced set spray parameters. Here, we are discussing other ability to measure porosity in plasma-spraying coatings with emphasis on atmospheric plasma sprays (mixed with titanium-oxide and carbide) of zirconium oxide. Microstructures with XRD as a part of non- destructive testing methods had been used to check the structural values with thermal impact. A L16 orthogonal array used for optimise the parameters with Taguchi optimal method by segregating parameters for better optimal results.

Key words: Plasma spray, TBC, Zirconium, Taguchi, SS304, SEM

1.0 Introduction

In advanced gas turbines thermal barrier coats (TBCs) are commonly used for shielding the metallic substratum from high temperature gas thermal dehydration [1, 2]. The use of TBCs will increase the efficiency and performance of turbines significantly. A standard TBC system consists of a container load, ceramic top-coat (TC), a metal bond-coat, and the heat oxide (TGO), the thermally developed oxide, forming between TC and BC. Temperature reductions in all TBC's are usually controlled by material and geometry, in particular thermal conductivity and thickness, of the TC layer in a specific work area. [3–9]. The thermal insulation potential of the coating's improvements with the increase in the TC thickness of a given ceramic material. The thermal mismatch stress of the coatings will nevertheless increase at the same time. The thermal insulation capabilities and the thermal stress level are well-recognized. Defining the required TC thickness for the hot components becomes a problem with optimization process.

2.0 LITERATURE REVIEW

The optimal TBC design will enhance the efficiency and performance of the coating with the thickness for gas turbine sheets. It is desirable for the layer design for engineering applications to be usable, easy and effective. Sadly, little work on this matter has been published. The substrate without TBC, for example the failure analysis of the blade [10–12], the simulation of heat transfer [13, 14], etc, or the

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RESEARCH ARTICLE

WILEY

Segmentation of tumor using PCA based modified fuzzy C means algorithms on MR brain images

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Abstract

In the field of medical sciences, automatic detection of tumor using magnetic resonance (MR) brain images is a major research area. The goal of the proposed work is to identify the tumors in MR images using segmentation methods and to locate the affected regions of the brain more accurately. Medical images have vast information but they are difficult to examine with lesser computational time. An innovative process is proposed to extract tumor cells using the discrete wavelet transform (DWT). After extracting features with DWT feature reduction is carried out with the principal component analysis (PCA). Modified fuzzy C means (MFCM) technique is used for segmenting the tumor cells. The efficiency of the proposed method to identify different abnormalities in real MR images for intracranial neoplasm detection, tuberculoma, and bilateral thalamic fungal granulomas identification is tested. The results obtained are shown in-terms of Accuracy, Dice Similarity Index (DSI), and Jaccard Index (JI) measures. The performance of the proposed method is tested in terms of performance measures like Accuracy, DSI, and JI. These results are compared with the conventional fuzzy C means (FCM) method.

KEYWORDS

brain tumor, DWT, feature extraction, fuzzy C means and MRI

1 | INTRODUCTION

The objective of the medical image processing techniques is to identify images or objects with tranquil visually. Medical images are used as an evidence for the physical attributes. MRI images are used to identify tumors in brain. The most significant aspect is segmenting the tumors to locate the actual position and regions of the abnormal tissues in MRI images. The tumors can have variability in shape, size, and can appear at any position in brain with diverse intensities. They are classified into two categories:

- Benign tumors are consistent compositions that do not enclose cancer cells. They are simple to monitor by radiological apparatus. These tumors may eternally develop back again.
- Malignant tumors are inconsistent compositions and they comprise of cancer cells. They have to be treated by the combination of radiotherapy and chemotherapy. They are life frightening.

In this article, we have concentrated on three types of diseases:

1. *The intracranial neoplasm disease*: It is formed when abnormal cells mount up in the interior lobe of the brain, formally named as a tumor. These cells reproduce in an abandoned way and destruct the brain tissues.

Computational and experimental analysis of $LiFePO_4$/C cathode material for lithium ion battery applications

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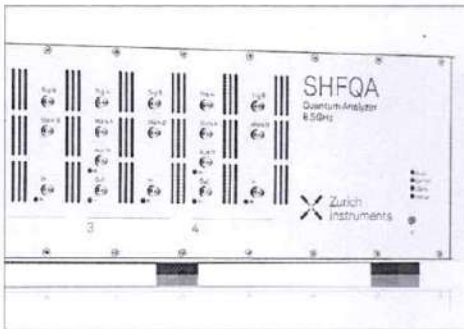
Subhashini Vedala, M. Sushama, and M. Aruna Bharathi



Design and analysis of grading high plate type spacer in a single phase gas insulated busduct for reduction of electric field stress

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K. Sushma, G. V. Nagesh Kumar, M. Aruna Bharathi, and Sravana Kumar Bali

Field stress control of a post type grading low insulating spacer with functionally graded material in a gas insulated bus duct

Cite as: AIP Conference Proceedings **2269**, 030045 (2020); https://doi.org/10.1063/5.0019504
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N. Chaitanya Dathu, G. V. Nagesh Kumar, M. Aruna Bharathi, and Sravana Kumar Bali

Insulation integrity of grading high insulating spacer with functionally graded material in a Gas Insulated Busduct

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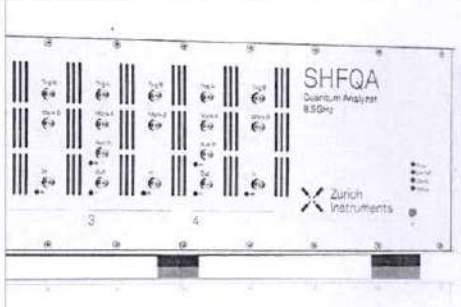
A. Rukmananda, G. V. Nagesh Kumar, M. Aruna Bharathi, and Sravana Kumar Bali



Applications of Computing, Automation and Wireless Systems in Electrical Engineering pp 383–392

Krill Herd Algorithm for Solution of Economic Dispatch with Valve-Point Loading Effect

Harish Pulluri, N. Goutham Kumar, U. Mohan Rao, Preeti & Mekala Girish Kumar

Conference paper | First Online: 01 June 2019

925 Accesses | **1** Citations

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 553)

Abstract

The article presents a novel bio-inspired Krill Herd (KH) algorithm to solve economic dispatch problems. KH algorithm is based on crowding behavior of the krill individuals and achieves a near global optimum solution by using three main actives. The proposed algorithm is tested by considering three and six generating unit systems on different loads on objective function. The attained results have proved that the KH algorithm provides remarkable results as compared with the

Synthesis and charecterization of $LiMn_{1.5}Ni_{0.5}O_4$ by sol-gel method for cathod material & it's application in Li-ion battery

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Synthesis And Charecterization Of $LiMn_{1.5}Ni_{0.5}O_4$ By Sol-Gel Method For Cathode Material & It's Application In Li-Ion Battery

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Abstract. Our past decade witness to the quick growth of Li-Ion battery industry in response to the growing needs of electronic and information industries. Lithium Cobalt Oxide used as Initial cathode material for Lithium batteries application it consist of high toxic nature, costly and with low energy density. Thus there need to develop new Li-Ion batteries to improve above characteristics along with efficiency and make it portable. So that can be used in electronics, transportation, and energy storage and especially in hybrid electric vehicles.$LiMn_{1.5}Ni_{0.5}O_4$ is hence the best development seen so far. It is improved version of $LiCoO_2$. It usually overcomes all the problem of older lithium batteries. The high initial capacity and good cycling behavior of $LiMn_{1.5}Ni_{0.5}O_4$ powders calculated at higher temperatures are closely related with the higher crystalinity and retention of the spinel structure with cycling and hence proved that $LiMn_{1.5}Ni_{0.5}O_4$ is far better than other batteries. For synthesizing $LiMn_{2-x}Ni_xO4$, we use sol-gel procedure. The electro chemical performances of prepared samples are tested. The crystalinity and lattice constants by X-Ray diffraction, thermal analysis by TGDTA, morphology by SEM and bonding between the atoms by FTIR were studied in this paper.

INTRODUCTION

In order to improve the efficiency energy density of LIBs, the cathode materials having either high reversible capacity or high operating voltage have been developed. Ni doped manganese spinel having operating voltage higher than (>4.6Vvs.Li/Li^+) that of conventional $LiMn_2O_4$ (4V) cathode material. The 4V manganese spinel suffers from structural degradation and John-Teller distortion, which is occurred due to Mn valance changes to Mn^{3+} in discharging period. This problem is overcome by the Ni doped Mn spinel $LiMn_{1.5}Ni_{0.5}O_4$ (LNMO), in which Mn valence relics 4^+, because Ni ion are active with electron redox reaction ($Ni^{4+}\leftrightarrow Ni^{2+}$). So LNMO is free from Jahn- Teller distortion and disproportionation reaction. Hence LNMO provides outstanding structural stability with high working voltage (>4.6Vvs.Li/Li^+) beneficial with respect to energy density and cycle life as a cathode for LIBs.

Partial replacement of Mn in $LiMn_2O_4$ with Ni is effective approach to improve the electrochemical properties of $LiMn_2O_4$ because the bonding energy of Ni-O is stronger than Mn-O. The stronger Ni-O bond is in favor of maintaining the spinel structure during cycling. This prevents the structural disintegration of materials. In case of Ni doping, the ionic radius of 0.64A°, which is nearly the same as that of Mn^{4+} (0.54A°) , so Ni can substitute for Mn in $LiMn_{1.5}Ni_{0.5}O_4$.The strong Ni-O bond is beneficial to improve electrochemical properties of $LiMn_2O_4$. Cation doping (like Ni) can improve conductivity, enlarge lattice constants and form stronger M-O bond, etc., which are favorable for the migration of lithium ions and maintaining stable crystal structure. Better electrochemical properties can be expected by choosing appropriate elements and amount. The advantage of $LiMn_{1.5}Ni_{0.5}O_4$ has better structural stability superior to the un -doped manganese spinel ($LiMn_2O_4$).

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RESEARCH ARTICLE

AN ANALYTICAL STUDY ON NPAS OF STATE BANK OF INDIA

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Key words:-
Non-Performing Assets, State Bank of India (SBI), Merger, RBI Resolutions

Abstract

Objectives: The main objective of this paper is to make an attempt to analytically study the basic reasons for increase in NPAs/analyze gross NPAs in SBI group and the measures taken so far and their impact.
Method: Data is collected for the Variables namely Net Profit Margin, Return on Equity and Return on Assets, Gross NPAs to Gross Advances, Net NPAs to Net Advances, Cost to Income and Provision Coverage Ratio. Secondary data is collected for a period of 5 years i: e from 2014-15 financial year to 2018-2019 Financial Year. Statistical tool like percentage analysis is used to identify the reasons for increase in NPA's of State Bank of India.
Result: It was found in the study that, the major sectors contributed for the increase in NPAs in SBI are mid and Large corporates and not the priority sector. NPAs are increasing from the last five years as shown in the ratios calculated. This is due to change in the method of projecting NPAs and stringent norms by RBI.
Conclusion:The present paper analyzed and identified the reasons for increasing trend of NPAs in SBI group. SBI is in hope that it could see the development in coming years as they are expecting the resolutions for pending cases from the National Company Law Tribunal (NCLT).

Introduction: -

Public banks in India had been facing the problem of stressed assets over the period of time in spite of many resolutions. Recently, Reserve Bank of India came with revised framework for the functioning of banks with respect to stressed assets. RBI has made some stringent norms for the treatment of bad loans. Now it is also planning to ease certain norms (for small and medium enterprises) without diluting the spirit with which it has initiated resolutions. SARFAESI - Securitisation, Reconstruction and Financial Assets and Enforcement of Security Interest Act 2002[2] was a significant step in the reforms in financial sector in India.

As per the reports of Standard and Poor, April 2018, India is in 55th place among the top 100 largest banks in the world in terms of total assets held.

Union cabinet in India has approved the merger of State Bank of India (SBI) with five of its associates in 2017 with an aim to reduce the cost to income ratio, to help Indian economy to rank higher in the global banking rate, to rationalize more resources etc.

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Enhanced microwave absorption properties of $Ni_{0.48}Cu_{0.12}Zn_{0.4}Fe_2O_4$ + polyaniline nanocomposites

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ARTICLE INFO

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ABSTRACT

Nanocomposites of (1-x) $Ni_{0.48}Cu_{0.12}Zn_{0.4}Fe_2O_4$ (NCZ) + x Polyaniline (PANI), (x = 0, 0.1, 0.2, 0.3, 0.4, 0.5, 1) with varying composition were successfully prepared from nanopowders of $Ni_{0.48}Cu_{0.12}Zn_{0.4}Fe_2O_4$ synthesized by microwave hydrothermal method. The samples were characterized using X-ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier Transform Infrared spectroscopy (FTIR). The characterization studies revealed the confirmation of spinel and polymer phases in the composite samples. The dielectric, magnetic and electromagnetic properties were studied over frequency range of 8.2–12.4 GHz (X-band) and 12.4–18 GHz (Ku-band). It was found that the addition of PANI filler in ferrite matrix enhances the microwave absorbing properties with the increment of dielectric and magnetic losses. The nanocomposite sample with 50 wt% PANI was found to exhibit minimum reflection loss of −42.10 dB near 9.35 GHz with the effective bandwidth of 3.8 GHz and −39.34 dB near 14.05 GHz with effective bandwidth of 2.8 GHz. The current results indicate that the present materials can be selected to design microwave absorbing filters both in X-band and Ku-band frequency regions for electromagnetic interference applications.

1. Introduction

In recent years there is an increase in demand for the development of absorbing materials in microwave frequencies region to suppress the effects of electromagnetic interference (EMI). Due to the fast development of advanced technology in several fields such as electronic wireless communications, military, commercial and medical applications, there has been widespread use of microwave devices in GHz frequency range [1–3]. These devices are capable of producing electromagnetic interference which can cause severe interruptions on functioning of several electronically controlled devices resulting in decrease in performance. Moreover, over exposure to microwave energy may lead to potential health hazards to the human body [4,5]. Hence, while using high frequency electronic devices EMI becomes a matter of serious concern. In order to control these problems created by electromagnetic interference the devices have to be shielded by the materials which can suppress the unwanted electromagnetic radiation and reduce the noise level of signals. Traditionally, conducting materials can shield the devices by reflecting the electromagnetic radiation. However, in the case of conducting shields the main drawbacks are heaviness, lack of flexibility, high cost of processing, etc. Electromagnetic shielding through absorption instead, offers an effective means to solve these problems. Hence, shielding materials capable of absorbing unwanted electromagnetic waves were investigated by many researchers [6–11]. In order to acquire excellent microwave absorbing properties, the shielding materials should possess mainly two important characteristics, viz., the wave attenuation through the material layer, called attenuation characteristic and the impedance matching, the impedance of the material medium should match the impedance of free space. In addition to these, the other parameters such as light weight, thickness, mechanical strength, miniaturization, wider absorption bandwidth, environmental resistance, should be taken care of while producing and designing the microwave absorbing materials [12]. Over the past decades ferrite absorbers have been developed to study the microwave absorbing properties and found that they exhibit excellent magnetic and dielectric properties though they are heavy and expensive [13]. Polymers were designed to be used for microwave shields due to lightweight, flexibility and cost effectiveness. However, polymers are insulating materials and are transparent to electromagnetic waves. In order to suppress electromagnetic waves effectively by the materials with enhanced microwave absorbing

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Dielectric relaxation and thermodynamic study of Dimethylformamide/ 1,4-Butanediol binary mixtures in the temperature range 298K–323K

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ARTICLE INFO

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Dipole moment
Dielectric relaxation
Excess parameters
Effective Kirkwood correlation factor (g^{eff})
Helmholtz energy
Mixing rules

ABSTRACT

In the present paper, the permittivity of Dimethylformamide (DMF) with 1,4-Butanediol (BD) binary mixtures are determined at the temperature range of 298 K–323 K in the microwave frequency. Dipole moment (μ), excess molar volume (V_m^E), partial molar volume ($V_{m,i}$), excess permittivity (ε^E), excess refractive index (n_D^E), excess inverse relaxation time ($1/\tau)^e$, thermal expansion coefficient (α_P), excess Helmholtz energy (ΔF^E) are determined at different temperatures. Redlich-Kister polynomial equation is used to fit the excess parameters. Havriliak-Negami equation is used to analyse the relaxation time of the binary mixtures throughout the measured temperature range. The heteromolecular interaction between DMF and 1,4-Butanediol binary mixtures are interpreted in terms of Kirkwood correlation (g^{eff}) factor. The stability of the system is analysed from the activation energy (ΔG^*), enthalpy (ΔH^*) and entropy (ΔS^*) parameters. The various mixing rules were applied in order to estimate the permittivity and refractive indices of the binary system at different temperatures.

1. Introduction

The complex permittivity of binary liquid mixtures provides information regarding the solute-solvent interactions and also the existence of monomers and multimers in the solution. The permittivity is a macroscopic parameter plays a significant role in understanding the nature of molecular interaction between polar-polar, polar in a non-polar liquid medium and also the alignment of dipoles in the solution [1–10]. The profound knowledge in thermodynamics and transport properties of pure liquids and their binary mixtures is essential to solving many chemical engineering problems, heat and mass transfer, and drug design calculations. The temperature dependent dielectric relaxation studies of different polar liquids at different microwave frequency region can yield the information regarding the structure of the molecule, inter and intra molecular hydrogen bonding and orientational polarization of the dipoles [11–23]. Investigation of permittivity of polar liquids having the hydrogen bond donor and acceptor group compounds are very much useful for various number of applications in the field of biological, medical, material science and technology [24,25].

Dimethylformamide (DMF) is a polar (hydrophilic) aprotic solvent with a high boiling point. DMF is used as a solvent in peptide coupling for pharmaceuticals, pesticides production, manufacture of adhesives, synthetic leathers, fibre films and surface coatings. Whereas 1,4-Butanediol (BD) is used in the manufacturing of plastics, fibres, and as solvent for many chemical reactions. Several researchers and scientists reported the dielectric relaxation of DMF in the different solvent medium such as toluene, benzene, benzoates, 3-Nitrotoulene in the recent past [26–37]. Stockhausen et al. [38] studied the dielectric relaxation of BD + DMF binary mixtures in the range of 5 MHz–72 GHz at 20 °C. The relaxation times of the binary mixtures are interpreted in terms of empirical equation by considering viscosity terms and the rotation of carbon chain group. Navarkhele et al. [39] also studied the dielectric relaxation behaviour of BD + DMF binary mixtures in the frequency range 10 MHz–20 GHZ between the temperatures 20^0C–40 °C. The relaxation time of these mixtures is calculated from the Cole-Cole plot and the molecular interaction are discussed in terms of excess permittivity and Kirkwood g factor [40]. The physico-chemico properties of the binary mixtures of DMF with alkanols and their interactions are interpreted by considering the molar volume and refraction values [41]. Whereas in the present study we have considered volumetric and thermal expansion (α_P) parameters [42,43], electrical dipole moment, molar polarization [23], long-range and short-range interactions between the dipoles by excess Helmholtz energy (ΔF^E) equation [44], thermodynamic quantities [45] to interpret the molecular interaction between 1,4- Butanediol

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19-20-(18)

Attenuation Effect in Twenty One Different Proton Dissociation Equilibriums Brought on One Rope: A Chemical Education Tool for Evaluation of pK_a of Proton Dissociation Equilibrium of Any Substituted Benzene (XC_6H_5)

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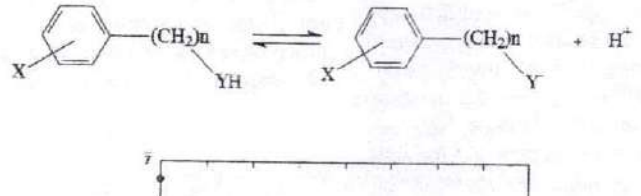
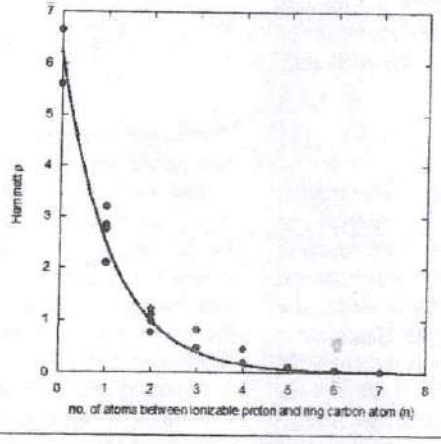
Abstract The strong empirical relation, $\rho = (2.4)^{(2-i)}$, between the Hammett ρ for proton dissociation of several acids and the number, "*i*", of atoms between the ionizable hydrogen and the ring carbon (Andrew Williams, Free Energy Relationships in Organic and Bioorganic Chemistry, Royal Society of Chemistry, Cambridge, 2003, p. 75) is used to construct a graph for twenty one different proton dissociation equilibriums. The plot of Hammett ρ versus number of atoms *i* between ionizable hydrogen and the ring carbon atom is observed to be an excellent exponential-decay locus. A good average and intelligent value of Hammett ρ is obtained for the benzene dissociation equilibriums by interpolating the locus of the correlation on to Y-axis. Using this Hammett ρ value and the Hammett equation $\log [(K_a)_X / (K_a)_H] = \rho\sigma$, the p$K_a$ value can be calculated for any substituted benzene knowing the pK_a value of benzene to be 43. The points for proton dissociation equilibriums of phenylethyl ammonium ions and benzyl alcohols deviated from the graph hence not included in the correlation. Possible explanations are given for deviation of these two equilibriums.

Graphical abstract

The term "attenuation" in general implies that it is the exponential depletion of some property either physical or chemical with time, distance and medium. Attenuation is an exponential property with the length of the medium. Of particular interest, it is the diminution of substituent electronic effects in a molecule during the course of any chemical change.





Influence of Slip and Heat and Mass Transfer Effects on Peristaltic motion of Power-law fluid Prone to the Tube

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Abstract. Present study deals with the study of peristaltic motion of a power-law fluid with nanoparticles in a tube with permeable walls. Heat and mass transfer effects and slip effect are studied in this investigation. Axial velocity, pressure gradient and frictional force are expressed analytically and investigated various parameter effects on these flow variables. The present model revealed that, heat transfer coefficient and mass transfer coefficients increases in the region [-1, 0] and decreases in the region [0, 1] with the increase of thermophoresis parameter and shows an opposite behavior with the increase of Brownian motion parameter. Pressure drop increases with the increase of slip parameter. Frictional force decreases with the increase of slip parameter and converges to 1.

1. Introduction

Peristalsis is very important phenomena in the human body. This phenomenon has many biological and industrial applications. Many researchers have done investigations in the peristaltic transport. (Brasseur et al. (1987), Valanis and Sun (1969), Mishra and Ramachandra Rao (2003), K. M. Prasad (2009), Hayat et al. (2014), Chandra and Pandey (2018)).

"Power-law law fluid is a fluid in which the shear stress at any point is proportional to the shear rate at that point raised to some power". The problems based on non-Newtonian fluids have many applications and hence good number of researchers started working in this area. Ostwald-de Waele model is widely used model for non-Newtonian fluids focusing on power-law rheology. Power-law fluids are classified into three different types of fluids as given below:

n	Type of Fluid
<1	Shear-Thinning Fluids
=1	Newtonian Fluid
>1	Shear-Thickening Fluids

Many researchers done their research in this field (El Naby and El Shamy (2007), Hayat et al. (2006), Shukla and Gupta (1982)).

Nanofluids have many biomedical and industrial applications. New techniques are used using nanofluids for cancer treatments and for safer surgery for the delivery of drugs. A good amount of

19-20-(2)

Fourth order computational method for two parameters singularly perturbed boundary value problem using non-polynomial cubic spline

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Abstract: In this paper, we proposed a fourth order finite difference scheme using non-polynomial cubic spline for the solution of two parameters singularly perturbed two-point boundary value problem having dual boundary layer on a uniform mesh. In this method, the first order derivatives in the non-polynomial cubic spline finite difference scheme are replaced by the higher order finite differences to get the discretisation equation for the problem. The discretisation equation is solved by the tridiagonal solver discrete invariant imbedding. The proposed method is analysed for convergence and a fourth order rate of convergence is proved. The numerical results are compared with exact solutions and the outcomes of other existing numerical methods.

Keywords: two parameters; singularly perturbed; two point boundary value problem; dual boundary layer; characteristic equation; non-polynomial cubic spline.

Reference to this paper should be made as follows: Phaneendra, K. and Mahesh, G. (2019) 'Fourth order computational method for two parameters singularly perturbed boundary value problem using non-polynomial cubic spline', *Int. J. Computing Science and Mathematics*, Vol. 10, No. 3, pp.261–275.

Biographical notes: K. Phaneendra is working as an Assistant Professor at the Department of Mathematics, University College of Science, Saifabad, Osmania University, Hyderabad, India. He did his PhD from N.I.T. Warangal in the area of numerical methods for singular perturbation problems. His area of research is numerical solution for a class of singularly perturbed which includes differential difference equations, singular boundary value problems and multi parameter problems. He published 36 research articles in various international journals.

G. Mahesh is Research Scholar in the Department of Mathematics, University College of Science, Saifabad, Osmania University, Hyderabad, India. His area of research is numerical solution to two parameter singularly perturbed boundary value problems. He published two research articles in reputed journals.

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19-20-(3)

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Review article

Can Non-bonded Pair of Electrons of Sp^3 Nitrogen with Two Single σ-Bonds on Either Side Still Transmit Substituent Electronic Effects to the Reaction Site? Reversal of Attenuation Effect by Sp^3 Nitrogen–A Chemical Education Perspective

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ABSTRACT

Dependence of reactivity of organic molecules on substituents was a well-established phenomenon in terms of Hammett and Taft equations in physical-organic chemistry. The well-known Hammett and Taft linear free energy relationships were extensively used in elucidating the organic reaction mechanisms. The exponential depletion of Hammett reaction constant (ρ), as a function of distance in terms of increasing the number of sp3 carbon atoms (-CH_2-) between the reaction center and the substituent, is understood from our laboratory experiments. But, introduction of sp^2 carbon atoms (-CH=CH-) between the reaction center and the substituent enhances the Hammett reaction constant (ρ). In the present work, we have tried and observed the same and even little more effective transmission of substituent effect through sp^3 nitrogen (-NH-). However, the presence of a sp^3 carbon by the side of sp^3 nitrogen (-NH-CH_2-) depletes the substituent effect in the usual manner in *N*-phenyl glycines. Probable explanations were presented in support of our observation. In the present work, the observations were manifested in terms of Taft ρ^* values instead of Hammett ρ value as the pK_a values of only 4-nitopheylcarbamic acid and carbamic acids and the Taft σ^* values of 4-nitrophenyl and H are available from literature.

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AIP Conference Proceedings

Preparation and characterization of red emitting Yttrium Vanadate phosphor doped with Eu(III): $Y_{1-x}VO_4$: Eu_x

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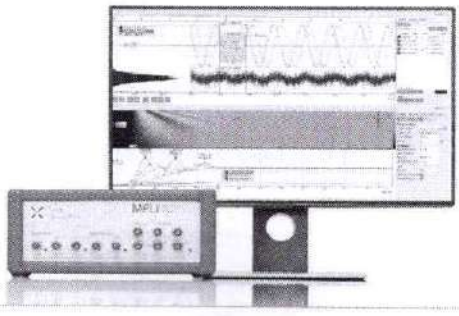
G. Neeraja Rani, J. Shankar, J. Anjaiah, B. Mamatha, and N. H. Ayachit



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19-20 — (6)

Shielding Effectiveness studies of NiCuZn ferrite-Polyaniline nanocomposites for EMI suppression applications

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Abstract. Electromagnetic interference shielding effectiveness (EMI SE) of multifunctional NiCuZnFe2O4-Polyaniline are studied. The nanocrystalline NCZ–PANI nanocomposites were prepared by the mechanical milling process. The structure and the morphology of the nanocomposites were investigated by Fourier Infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). Electromagnetic properties and EMI SE behaviors were performed over a frequency range of 8.2-12.4 GHz (X-band) and 12.4–18 GHz (Ku-band). The results show that for nanocomposites, the values of the real (ε′) and imaginary permittivity (ε″) and imaginary permeability (μ″) increase, while the value of real permeability (μ′) decreases as the filler content (PANI) increases. The contributing effects of PANI content on total shielding efficiency (SE_{total}) of different samples were investigated. The maximum EMI SE of 29 dB is obtained for a composite of 50 wt.% PANI with the dominant shielding by absorption (SE_A) of electromagnetic radiation. The enhanced electromagnetic shielding performance of nanocomposites is attributed to the increment of both magnetic and dielectric losses due to the incorporation of conducting PANI in magnetic NCZ matrix. Synthesis parameters such as the amount and particle size of PANI and NCZ affect significantly the morphology, the conductivity, and the microwave absorption properties of the final materials. The possibility to modulate the electromagnetic properties of the composite materials is of great interest to fabricate microwave absorbing and electromagnetic shielding materials with high performances.

INTRODUCTION

To reduce the impact of electromagnetic interference (EMI), EMI shielding materials have been widely investigated. Normally, metals have been used for EMI shielding materials as they have high conductivity and dielectric permittivity. [1, 2] However, metals have disadvantages, such as their corrosion, weight properties, and poor processability.[3] Ferrite–polymer nanocomposites have been used extensively in the shielding of electromagnetic noise due to their excellent electromagnetic properties.[4–6] The polymer and ferrite composites can be used as EMI suppressor materials to avoid the disadvantages seen in metals.[7,8] The complex permittivity and permeability are closely related to the high-frequency dielectric and magnetic properties of magnetic particles and volume fraction of the fillers in the composites. Ferrites are used as magnetic fillers in the composites due to the high magnetic loss, high chemical stability, and high resistivity, etc. The high-frequency dielectric and magnetic properties can be tuned by varying the ferrite concentration in the ferrite-polymer composites.

In the present investigation, various Polyaniline (PANI) loaded Ni0.48Cu0.12Zn0.4Fe2O4 (NCZ) matrix nanocomposites were prepared at room temperature. The NCZ can be used in microwave devices and electromagnetic suppression fields due to their high saturation magnetization, excellent chemical stability, and corrosion resistance. The composite powders were the effect of the volume fraction of PANI on the frequency dispersion characteristics of the complex permittivity (ε′ & ε″), permeability (μ′ & μ″) and EMI SE properties were studied and the obtained results were discussed in the paper.

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Educación Química

19-20-(7)

NON-ASSOCIATIVE BEHAVIOR OF THIOPHENOLS: TROUTON'S RULE, RAMSEY-SHIELDS- EÖTVÖS EQUATION AND APPLICATION OF HAMMETT EQUATION TO THE SURFACE TENSION DATA – A CHEMICAL EDUCATION PERSPECTIVE

R. Sanjeev[1], David Geelan[2] and V. Jagannadham[3]*

Abstract

Non-associative behavior of thiophenols is explained on the basis of Trouton's rule, proton acceptor-donor cites and application of Hammett equation to the surface tension data of thiophenols.

Keywords

Trouton's rule, Proton acceptor-donor cites, Hammett equation

Comportamiento no asociativo de los tiofenoles: regla de Trouton, ecuación de ramsey-shields-eötvös y aplicación de la ecuación de Hammett a los datos de tensión superficial: una perspectiva de educación química

Resumen

El comportamiento no asociativo de los tiofenoles se explica sobre la base de la regla de Trouton, las citas del donante aceptor de protones y la aplicación de la ecuación de Hammett a los datos de tensión superficial de los tiofenoles.

Palabras clave

La regla de Trouton, las citas del donante aceptor de protones, la ecuación de Hammett

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Sanjeev, R., Geelanb, D. and Jagannadham, V. (2019). Non-associative behavior of thiophenols: trouton's rule, ramsey-shields- eötvös equation and application of hammett equation to the surface tension data–a chemical education perspective. *Educación Química. Vol 30(4)*, 00-00. DOI: 10.22201/fq.18708404e.2019.4.69633

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Journal of Applied and Computational Mechanics

Research Paper

Effect of Chemical Reaction on Bioconvective Flow in Oxytactic Microorganisms Suspended Porous Cavity

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Abstract. In this paper, the bioconvective flow in a porous square cavity containing oxytactic microorganism in the presence of chemical reaction is investigated. The bioconvection flow and heat transfer in porous media are formulated based on the Darcy model of Boussinesq approximation. The governing partial differential equations are solved using the Galerkin finite element method. The computational numerical results are exhibited by the streamlines, isotherms, isoconcentrations of oxygen, isoconcentrations of microorganisms, average Nusselt number, average Sherwood numbers of oxygen concentration and microorganisms. The effects of key parameters such as bioconvection Rayleigh number (Rb), chemical reaction parameter (Kr) and thermal Rayleigh number (Ra) are presented and analyzed. It can be deduced that the chemical reaction reduces the strength of isoconcentrations of both oxygen and microorganisms. It has been revealed that the chemical reaction has a greater effect on the swimming of the microorganisms, average Nusselt number, and average density number.

Keywords: Thermo-bioconvection, Oxytactic Microorganisms, Porous square cavity, Chemical reaction, Finite Element Method.

1. Introduction

Abundant investigations on convective heat transfer in porous media are ascribed to the enormous of applications, such as utilization and storage of thermal/geothermal energy, reservoirs of petroleum, devices of catalytic convertors, dispersion of underground pollutants, underground feeder cables, technology of porous ceramic burners, food industry, tertiary recovery, chemical reactors, chemical separations, moisture migration in stored grain, thermal cooling of electronic equipment, , heating of rooms, combustion, etc. The basic nature and the increased volume of work in this area are adequately archived in the books by Nield and Bejan[1], Ingham and Pop [2], Vafai[3], Pop and Ingham [4]. Natural convection in cavities of various geometries discovers a salient feature for engineering analysis. It has huge applications in engineering, such as solar applications, building applications, electronic industry, etc. Natural convection phenomena in the porous square cavity are investigated by Rahman et al.[5] and Balla et al. [6-8].The latest development for microfluidic devices is heat transfer in porous media with bioconvection phenomena. Bioconvection refers to a macroscopic convective movement of fluid-induced by the swimming of motile microorganisms. Different types of microorganisms can be found, showing various swimming behaviours. Negatively geotactic microorganisms swim

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Bioconvection in oxytactic microorganism-saturated porous square enclosure with thermal radiation impact

Chandra Shekar Balla[1] · Alluguvelli Ramesh[2] · Naikoti Kishan[3] · A. M. Rashad[4] · Z. M. A. Abdelrahman[5]

Received: 20 July 2019 / Accepted: 1 November 2019

Abstract
This investigation addresses bioconvection of oxytactic microorganisms in a porous square enclosure by thermal radiation impact. The bioconvection flow and heat transfer in porous media are formulated based on Darcy model of Boussinesq approximation. Appropriate transformations lead to the non-dimensionalized governing partial differential equations. Galerkin finite element method for the resulting equations is computed. The role of relevant parameters on the streamlines, isotherms, isoconcentrations of oxygen and microorganisms and average Nusselt number is analysed in the outputs. It is revealed that the flow intensity of bioconvection is pronounced with larger Rayleigh number and reduced with radiation parameter. Furthermore, the temperature distribution is affected significantly with Rayleigh number. Radiation parameter serves to fasten the heat transfer in the enclosure. Oxygen density is enhanced with Rayleigh number and radiation parameter. The profile of motile isoconcentrations is boosted with Rayleigh number. The stability of microorganisms is improved with the radiation parameter.

Keywords Thermo-bioconvection · Oxytactic microorganisms · Thermal radiation · Porous square cavity · Finite element method

List of symbols

b	Chemotaxis constant, m
C	Concentration of oxygen
$C_{\min}$	Minimum concentration of oxygen required for microorganisms to be active
C_0	Concentration at free surface
C_P	Specific heat at constant pressure
D_C	Diffusivity of oxygen, $m^2\ s^{-1}$
D_n	Diffusivity of microorganisms, $m^2\ s^{-1}$
g	Acceleration due to gravity, $m\ s^{-2}$
K	Permeability of the porous medium
k^*	Mean absorption coefficient
L	Length of porous cavity, m
Le	Lewis number
n	Number density of motile microorganisms
n_0	Average density of the microorganism
N	Dimensionless number density of microorganisms
Nu_Y	Local Nusselt number
Nu_{avg}	Average Nusselt number
Nn_Y	Local Sherwood number of microorganisms
Nn_{avg}	Average Sherwood number of microorganisms
p	Excess pressure above hydrostatic
Pe	Peclet number
q_r	Radiative heat flux
Ra	Rayleigh number of porous medium
Rb	Bioconvection Rayleigh number
Rd	Radiation parameter
Sh_Y	Local Sherwood number of oxygen concentration
Sh_{avg}	Average Sherwood number of oxygen concentration
T	Temperature, K
T_H	Temperature at hot wall, K
T_C	Temperature at cold wall, K
T_∞	Ambient temperature, K
u, v	Velocity components in x, y-directions, $m\ s^{-1}$

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Investigation of temperature dependent dielectric relaxation studies of 1,4-Butanediol/DMSO binary mixtures at the microwave frequency

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ABSTRACT

In the present manuscript, we are reporting the complex dielectric permittivity of 1,4-Butanediol/Dimethylsulfoxide binary mixtures for entire concentrations in the temperature range of 298.15 K–323.15 K. The complex dielectric permittivity is measured in the frequency range of 20 MHz–20 GHz. The dielectric relaxation time (τ) of the binary mixtures are analyzed by using the Havriliak-Negami equation. Redlich-Kister polynomial equation is used to fit the excess molar volume (V_m^E), excess permittivity (ε^E), excess refractive index (n_D^E), excess inverse relaxation time $(1/\tau)^E$. The molecular association and structural packing in the liquid mixture are analyzed by using thermal expansion coefficient (α_P) parameter. The ordering nature of the molecular dipoles is discussed by evaluating the Kirkwood correlation factor(g^{eff}) and stability of the system by thermodynamic quantities. The experimental dipole moments of the pure and equimolar binary system are determined by using Higasi's method and compared with the theoretical dipole moment values obtained from DFT/B3LYP methods. Confirmation of hydrogen bond between 1,4-butanediol and DMSO is supported with the FT-IR and UV-Vis spectroscopy methods. The experimental dielectric and spectroscopic studies confirm the existence of hydrogen bond between the liquid mixtures.

1. Introduction

The interaction of electric energy with the material mainly depends upon the characteristic property of the material, which plays a significant role in the determination of structural properties of the compounds. The usage of microwave heating has become important in the field of food processing, synthesis of chemical compounds, local heating of the biological tissues and medicinal industry [1–5]. The capability of the material to absorb microwave energy depends upon the macroscopic permittivity, which is connected with the dielectric loss of the material [6,7]. By choosing the proper polar solvent in the chemical industry can stimulate or prevent the chemical reaction, and modify the structural dynamics of the system. Hence, the study of dielectric properties of the polar liquids in the microwave frequency region is very much important in understanding the applications of microwave energy. The dielectric study of the liquid mixtures having the hydrogen bond donor and acceptor group compounds is useful for a various number of applications in the field of biological, medical, material science and technology [8,9].

Dielectric relaxation studies of 3-Nitrotoulene with diethylacetamide, dimethylsulfoxide binary mixture are studied by Ajay Chaudhari et al. [10] and their studies reveal that effective dipoles rotate slowly in the mixture due to the hindering field produced by the multimers in the solution. The equilibrium properties of butanediols and temperature dependence of shape factor is studied by Zhuravlev et al. [11] and explained that relaxation time depends upon the structural rearrangement of the molecules in the solution. The homogeneous and heterogeneous interaction between a series of three butanediols with 1,4 dioxane is studied by Gilani et al. [12–15] and dipropylsulfoxide in aqueous medium by Gabrielyan et al. [16]. Their studies confirm the presence of hydrogen bonding in the solutions affecting the excess dielectric parameters. The acoustic and thermodynamic properties of butanediols with respective pressure and temperature studied by Edward Zorebski et al. [17] and they reported that thermal expansion, compressibilities are increased with increase in the chain length of the molecules. The average number of hydrogen bonds, bonding energy associated with alcohol-DMSO mixtures are evaluated by Jia Guo-Zhu et al. [18,19] and chemical stability, the reactivity of the anilines, phenols in a nonpolar solvent medium by computational HOMO and LUMO calculations [20]. Molecular dynamics of the hydrogen bond network in the ethanol-water mixtures are reported by

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Research Article

Numerical Approach for Differential-Difference Equations with Layer Behaviour

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Abstract.
difference equations having layer behaviour, with delay as well advanced terms. The retarded terms

second order singular perturbation problem. A finite difference scheme using non polynomial spline

of the first derivatives. Tridiagonal algorithm is used to solve the resulting system. The method is exemplified on numerical examples with various values of perturbation, delay and advance parameters.

Also, the convergence of the proposed method has also been established.

Keywords.
absolute error

MSC. 65L10; 65L11; 65L12

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1. Introduction

and in the potential in nerve cells by random synaptic inputs in dendrites [18].

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FITTED DIFFERENCE APPROACH FOR DIFFERENTIAL EQUATIONS WITH DELAY AND ADVANCED PARAMETERS

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Abstract: A difference scheme involving acceptable fitting parameters is suggested for differential equations with delay and advanced terms, the solutions of which show boundary layer behaviour. First, the original problem is reshaped into asymptotically comparable second order singular perturbation problem using Taylor series approximation for the retarded terms. In order to obtain precise solution, fitting parameters are introduced in difference scheme using modified upwind differences for the first order derivatives. Thomas procedure is used to solve the resulting tri-diagonal difference system. The method is tested on numerical examples for various values of the perturbation, delay and advance parameters. Computed maximum absolute errors are tabulated. Numerical experiments are shown in graphs and the effects of small shifts have been studied on the boundary layer region. Also, convergence has been established of the proposed method.

Keywords: boundary layer; delay and advance parameters; modified upwind; singular perturbation problem.

2010 AMS Subject Classification: 65L10, 65L11, 65L12.

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Do phase transition temperatures T_{mp} and T_{bp} obey linear free energy relationships?

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ABSTRACT

Normal melting point of a solid is the temperature at which it changes its state from solid to liquid. At the melting point the solid phase and the liquid phase exist in equilibrium. And normal boiling point of a liquid is a property at which the vapor pressure of the liquid becomes equal to the atmospheric pressure. The four types of intermolecular forces: hydrogen bonding, ionic forces, Van der Waals dipole-dipole interactions and Van der Waals dispersion forces (London forces) and sometimes the polarizability affect the melting and boiling points. Hydrogen bonding is one of the key factors that largely affect both melting and boiling points of solids and liquids respectively having functional groups such as OH, NH_2 and a most electronegative atom F. And they are also affected by polar electronic effects of the substituents and by the size of the molecule due to the presence of the van der Waals attractions. Using Lindemann's equation $T_{mp} = \frac{4\pi^2 m\nu^2 c^2 a^2}{k_B}$ and strong foundation of Trouton's two empirical rules $\Delta S_{latent} = \frac{\Delta H_{latent} \times Density}{273 + T_{mp}}$ and $\Delta S_{vaporization} = \frac{\Delta H_{vaporization}}{273 + T_{bp}}$, Taft Linear Free Energy Relationship (LFER) is applied to the temperature of phase transitions (solid to liquid and liquid to vapor) of alkyl alcohols, alkyl amines, alkyl fluorides and aliphatic hydrocarbons. Two loci are observed in each case one with a negative slope for electron donating substituents and the other with a positive slope for electron withdrawing substituents with a minimum at CH_3 substituent (Taft $\sigma^* = 0.00$). The decreasing trends in both the melting and the boiling points with decrease in electron donating power of substituents and the increasing trends in both the melting and the boiling points with increase in electron withdrawing power of substituents are explained with two interpretations of hydrogen bonding in alcohols, amines and fluorides yielding the same dimers.

1. Introduction

The astonishing efforts in the direction of application of LFER to various physical properties like surface tension (γ) [1–8], dipole moments (μ) [8] and melting points [9] from our laboratory have ever been increasing with a good degree of success. Quantitative solubility-structure relationships for several *meta*- and *para*-substituted benzoic acids in benzene and in cyclohexane [10] and in 1, 4-dioxane and *tetra*-hydrofuran (THF) [11] were studied. Even the application of Hammett equation to melting points of some benzene derivatives were touched and left without any reasonable arguments [12]. Katritzky et al. gave a one line concluding argument on the application of QSPR models to the melting points of benzene derivatives in terms of molecular packing and intermolecular interactions [13]. There was a brief report on the application of Hammett equation to the dipole moments [14].

Schreck [15] had described this in an article on non-linear Hammett relationships as what appears to be the only physical property that gives non-linear Hammett plots. But solubilities are not completely physical properties as the solubility would be a function of ionizing capacity and ionization is a chemical property which depends on the dielectricity of the solvent and it will be taking place at a ***localized ionization site***. This gets support from the variation of Hammett ρ with solvent polarity [16,17].

It is from our laboratory who uncorked the detailed application of LFER to purely physical properties like surface tension (γ) [1–8], dipole moments (μ) [8] and melting points [9] except its mention on

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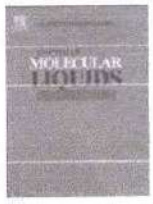

Short Communication

Is interfacial tension of a liquid-air interface thermodynamically a cyclic process?

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ABSTRACT

Brønsted ($\log k_B = \beta\, pK_a^{HB} + C$) and Taft ($\log k = \rho^*\sigma^* + \log k_o$) linear free energy equations are applied to the interfacial tension data of N-substituted anilines. The significance of the values of the constants Brønsted β (0.096) and Taft ρ^* (0.091) are explained in terms of proton transfer from the acid to the aniline, which is accelerated by electron donating groups. The deprotonation of protonated aniline is accelerated by electron withdrawing groups. Since any thermodynamic property associated with any kind of reaction is a point group, the fact that Brønsted β and Taft ρ^* have similar values with opposite sign indicates that the total process taking place at the aniline-air interface is a cyclic one.

1. Introduction

Our laboratory has for some time had an interest in the application of Linear Free Energy relationships to surface tension data [1–5] and to the nucleophilic solvation of aliphatic ammonium ions [6]. In the present article we apply the Brønsted and Taft equations to the interfacial tensions of some N,N-disubstituted anilines. To our knowledge this is the first time this analysis has been reported in the literature. The opposite signs and similar values of the trend lines of Brønsted β and Taft ρ^* are explained based on thermodynamic considerations.

2. Experimental data source

Data on the interfacial tensions of N,N-disubstituted anilines is from reference [7] and references cited therein. The pK_a and Taft σ^* values of N,N-disubstituted anilines are from reference [8]. All linear correlations were completed using KaleidaGraph software. Fig. 1 was drawn using ChemDraw.

3. Discussion

The main difference between surface tension and interfacial tension is that surface tension is defined in terms of a single liquid surface which is in contact with a gas phase, usually air. Interfacial tension, on the other hand is understood as occurring at the interface of two immiscible liquids. Surface tension is actually a derivation of interfacial tension where the force resulting from the second surface is negligible or zero. The surface tension of a pure liquid is simply the interfacial tension at the liquid-air interface, because the surface tension of air is zero. This is the case because surface tension needs a surface, and for a surface there must be two different phases in contact with each other. Gases do not form inter-phase surfaces. Surface tension is caused by intermolecular forces that keep molecules in a liquid together. Such forces do not exist or are negligible in the gas phase as the gas thermodynamically is assumed to be a very dilute system.

Fig. 1 shows a typical example of an aniline-air interfacial system.

Air always contains small amounts of carbon dioxide which dissolves in the moisture present in the air making it slightly acidic, with a pH of 5.7. This becomes a source of protons (H^+):

$$CO_2 + H_2O\ (\text{moisture}) \rightarrow H_2CO_3$$

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Frequency and temperature dependent dielectric studies of propylene glycol-sulfolane binary mixtures in the microwave frequency region

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ABSTRACT

The dielectric permittivity of propylene glycol/sulfolane binary mixtures have been determined at various temperatures in the frequency range of 0.02 ≤ν/GHz≤ 20 using open-ended coaxial probe method. The permitivity spectra of propylene glycol/sulfolane mixtures with an asymmetric shape is observed. The experimental dielectric permittivity, relaxation time values are used to obtain remaining excessive parameters such as excess permittivity (ε^E), deviation in refractive index (Δn_D) excess inverse relaxation time $(1/\tau)^E$, Kirkwood effective correlation factor (g^{eff}) and active thermodynamic parameters. Redlich-Kister polynomial equation is used to fit the excessive dielectric parameters. The molecular interaction between propylene glycol and sulfolane binary mixtures is interpreted in terms of short and long-range interactions among the dipoles. The experimental dipole moment values are compared with the theoretical dipole moment values from DFT/B3LYP, MP2 methods. Natural bond orbital (NBO) analysis is performed on the optimized geometrical structure of the above system to understand molecular interaction between the binary mixtures in terms of hydrogen bonding. The chemical stability of the system is studied from the HOMO-LUMO calculations. The energy of H- bond interaction between propylene glycol and sulfolane binary mixture is calculated from the single point energy calculations, and the results are correlated.

1. Introduction

The temperature and frequency dependent dielectric relaxation studies of liquid mixtures play a significant role in the investigation of various processes such as intra and intermolecular interactions, rotational dynamics of the molecules, interfacial polarization, relaxation process, solute-solvent interactions and strength of the interaction among the dipoles. The study of interest in carrying the dielectric spectra of binary and ternary liquid mixtures resides in analyzing the molecular dynamics of the systems and describing the possible variation from the pure components of the liquids and their ideal mixtures. The non-covalent interactions present in the liquid systems such as hydrogen bond, Van der walls, and electrostatic forces play an essential role in the field of biological activity, enzyme catalysis, and drug design [1]. The dielectric studies of different polar binary mixtures at different concentrations and temperature lead to analyze the strength of the hydrogen bond interaction in terms of thermodynamic parameters, ordering nature of the dipoles and their mutual interactions [2–6]. The dielectric relaxation spectroscopy is one of the sensitive methods to detect small changes occur in the structural parameters of a molecule in a liquid system. Several researchers performed dielectric studies on different liquid compounds in water as well as in alcoholic medium in recent past [7–17], at the same time molecular simulations are also performed to interpret experimental results [18–22]. The different spectroscopic studies such as FT-IR, proton NMR, and Neutron diffraction studies are also carried by the researchers to confirm the existence of hydrogen bond between the different liquid mixtures [23–25].

The present work is in continuation of our systematic studies in order to understand the molecular interaction between binary mixtures of propylene glycol and sulfolane. In our previous paper [43] (Vishwam et al.), we reported the molecular interaction behaviour of propylene glycol in ethanol medium and the data is interpreted in terms of thermodynamic parameters, strength of the hydrogen bond interaction from the single point energy method.

In the present manuscript, we are interested to analyze the effect of sulphonyl group on the dielectric relaxation process of propylene glycol medium. The molecular interaction of sulfolane in propylene glycol is studied in terms of short and long-range ordering of the dipoles, excess molar volume (V_m^E), molar polarization (P_m), Natural Bond Orbital analysis to identify the position of hydrogen bond. The chemical stability of the molecule is studied by Highest Occupied Molecular Orbital and Lowest Unoccupied Molecular Orbital (HOMO, LUMO) calculations and Redlich-Kister polynomial fitting procedure for excess dielectric

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Microstructure, frequency and temperature dependent dielectric properties of zinc ferrites

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ABSTRACT: Ferrite with the general formula $ZnFe_2O_4$ was prepared by microwave hydrothermal (M-H) method. The as-synthesized powder was pelletized and samples were sintered at different temperatures (600, 700, 800 and 900°C). The grain size was varied by sintering the ferrite at different temperatures up to 900°C. The characterization studies were conducted by X-ray diffraction (XRD) and scanning electron microscopy (SEM).Dielectric constant (ε') and dielectric loss tangent (tan δ) were measured as a function of frequency and temperature DC conductivity (σ_{ac}) was measured by temperature variation. A significant influence of sintering temperature on the microstructure and electrical properties was detected.

1. INTRODUCTION

Nanoscale magnetic particles are attracting more interest in the scientific community because of its efficient applications in color imaging, catalysis, data storage, drug delivery, ferrofluids and magnetic refrigeration systems [1].

Spinel ferrites are commercially important materials becausethey're excellent electrical and magnetic properties [2]. These classes of materials have been the subject of extensive studies by physicists and chemists alike. A whole range of distribution of cations is possible in spinels which can be represented generally by the formula $(Me^{2+})_\delta Fe^{3+}{}_{1-\delta}[(Me^{2+})_{1-\delta}Fe^{3+}{}_{1+\delta}]O_4$ where the ions inside the brackets are said to occupy octahedral sites (B) and the ions outside the bracket occupy the tetrahedral sites (A) [3]. In the above formula when d=1, it is called normal spinel. When d=0 it is called an inverse spinel. When d=1/3 it is called random spinel. From the fundamental point of view, these materials serve as ideal candidates for studying ferrimagnetism and ferromagnetic properties.

Zinc ferrite belongs to the normalspinels [4]. The properties of zinc ferrites have been the subject of study by manyinvestigators over the last two periods. It has been established that structurally $ZnFe_2O_4$ is a normal spinel where it can be written as $[(Zn^{2+})_A[(Fe^{3+})_B]O_4$ and its net magnetization is zero. Research on zinc ferrite showed that zinc ferrite is antiferromagnetic because of B-B interactions with a Neel temperature of about 10 K. It behaves as a paramagnet above the Neel temperature [5]. The abnormalities in the magnetic properties of zinc ferrite have been reported [6]. For case, Lotgering et al. [6] detected abnormalbehavior in the paramagnetic susceptibility of zinc ferrite. In their neutron diffraction studies,Brock-house and others [7] found the presence of a short-range order of parallel spins separated by 0.29 nm.

In the present investigation, the nanopowder of $ZnFe_2O_4$ was prepared using M-H method. The advantage of M-H method is given elsewhere [8]. The as-prepared powder was characterized using XRD, and SEM, frequency and temperature dependent dielectric properties (ε) and conductivity properties were studied and discussed in this paper.

2. EXPERIMENTAL METHOD

Pure zinc nitrate [Zn $(NO_3)_2$.$6H_2O$] and iron nitrate [Fe $(NO_3)_3$.$9H_2O$] were dissolved in 100 ml of de-ionized water. The molar ratio of powders was adjusted to obtain the composition $ZnFe_2O_4$. An aqueous NaOH solution was added to the mixture until the desired pH (~ 9.45) value was obtained. The precipitate was transferred into an autoclave and was treated with M-H method. In this method, the precipitate was taken into Teflon lined vessel and placed inside the microwave digestion system (Model MDS-2000, CEM Corp., Mathews, NC) and samples were synthesized at 165°C/45 min. Our M-H system is fully computer controlled one and uses 2.45 GHz microwaves and can be operated at 0-100% full power (1200±50W). The products obtained were filtered and then washed repeatedly with de-ionized water, followed by freeze-drying overnight. The prepared powders were weighed and the percentage yields were calculated from the expected and the amount that was actually

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Computational and experimental analysis of $LiFePO_4/C$ cathode material for lithium ion battery applications

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Computational and Experimental Analysis Of $LiFePO_4/C$ Cathode Material For Lithium Ion Battery Applications

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Abstract. The present research work, First principles calculations have proven to be outstanding tools to laboratory experiments in research because they can calculate some characteristics of a modeled system that are very hard to obtain experimentally. First principles calculations (CASTUP) also offer far greater ability to control and manipulate a system, providing the modeled system reflects the real system accurately. calculations and their applications in the research of positive electrode materials were studied. An economical and novel method for synthesis of Nano porous $LiFePO_4/C$ composite by glycine and urea assisted combustion method with fuel to oxidizer ratio $\Psi = 1$.The average crystallite size of obtained $LiFePo_4$ /C composite from x- ray diffraction is 40-45nm. Morphological studies were done using scanning electron microscope the structure of the surface coated carbon and the material were investigated by Raman spectroscopy. The structure of the material at the molecular size scale has been investigated by FTIR transmittance and Thermal Analysis and stoichiometry analysis for Fuel to nitrate ratio for urea and glycine and for various molarities and there balancing equations and calculation for Enthalpy of combustion and adiabatic flame temperature results were present.

INTRODUCTION

In The future use of electrical energy dangles on the development and optimization of the next generation secondary ion batteries [1]. Batteries are incorporated in almost all portable electronic devices rely on energy stored chemically in them [2]. The key to achieving that objective may lie on Stoichiometric optimization and synthesizing the cathode material using chemical methods for battery applications.

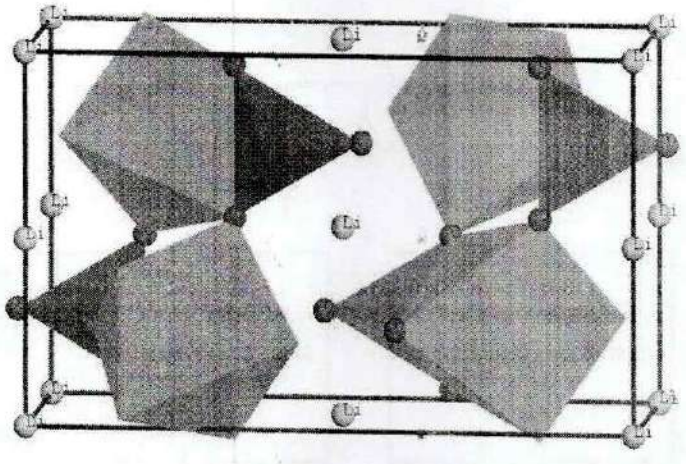

FIGURE.1 Crystal Structure of $LiFePO_4$ Nanocomposite Material.

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Design and analysis of grading high plate type spacer in a single phase gas insulated busduct for reduction of electric field stress

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K. Sushma, G. V. Nagesh Kumar, M. Aruna Bharathi, and Sravana Kumar Bali

Design and Analysis of Grading High Plate Type Spacer in a Single Phase Gas Insulated Busduct for Reduction of Electric Field Stress

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Abstract. Spacers are a key component of the gas-insulated structures. Most dielectric instances intensity collapses and ground flashover are attributed to distinguish the failures of spacer. Such Failures are due to non-uniformity distribution of electric field around the top of the spacer and high field tension at triple junctions. For a better electric field distribution, precise structure simulation of the spacers is important as it improves the component's existence. Rare pressure management results in problems such as moulding and manufacturing by shape modeling. In this paper, a graded high FGM insulating spacer is designed for a Single phase GIS for reduction of electric field stress. Stress in the electrical field for different values of high grading the FGM material is measured and the insertion of metal inserts is used to reduce the electrical field pressure.

INTRODUCTION

The severity of the electrical field distribution emerging it's growing within the GIS. The additional significance for analysis as the GIS becomes additionally lightweight. Out Of all the components inside GIS the electrical field stress formed on the surface insulating supporter connected between inner conductor and the outer conductor, influences the quality of GIS insulation. Strong field strains the spacer's surface, might lead to surface electric arc over an amount of your time. Junction shaped by the conductor, gas insulation and solidity dielectric at high voltage and ground conductor ends known as Triple Junction (TJ).This TJ is a different one, essential space wherever high force field stresses can lead to partial discharges. This might more result into surface electric arc on the spacer surface. Spacers are one amongst the essential elements in GIS liable dielectric breakdown of material strength and surface electric arc, injecting the necessity in the development of safe and reliable electric spacers for the cost-effectiveness of GIS. The field experiments were carried out on the spacer surface thought about in concert of the live in assessing the spacer output.

LITERATURE REVIEW

Perry, E.R [1] et al reviewed various insulator shapes such as sleek disk, furrowed disk and cone quality. It is seen that the cone type spacer has considerable potential. Dielectric corrosion can gradually reduce the power of the insulator. Misaki, T [2] et al thought-about a significant downside is the native field intensification on a cone-type spacer mounted all SF6-insulated flanges. The improved structure with the spacer's surface form and speaking to slightly modified position proved beneficial in increasing the intensification of native fields.

To date, several techniques have been applied to improve the insulation efficiency and the electrical strength of sensitive gas-insulated switchgears. Such methods, though, create a lot of sophisticated pure mathematics in the

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Field stress control of a post type grading low insulating spacer with functionally graded material in a gas insulated bus duct

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Field Stress Control of a Post Type Grading Low Insulating Spacer with Functionally Graded Material in a Gas Insulated Bus duct

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Abstract. High voltage electrical systems are plagued by certain problems, such as high stress delivery and damage to insulation, which are necessary to ensure efficient network service High pressure on the spacer surface in a gas-insulated bus duct is a major factor influencing the insulation strength , particularly at the conductor, insulator and gas contact point (called triple junction).Research studies of spacer shaping have been found to be effective in managing pressure distribution but difficult in real-time applications. In this paper, for the regulated field stress division on the spacer layer, dynamically graded post-type spacer materials with dissimilar low graded permittivity are planned. Electric field calculations for low graded materials are performed and a uniform distribution of stress along the spacer is achieved by correctly designed metal inserts integrated in GIS.

INTRODUCTION

As the GIS gets closer, the degree of electrical stress in the field that have been develop inside the GIS becomes extra important for learning. The electrical field pressure produced on the insulator surface acts as a buffer within the external enclosure for the inner conductor. Sometimes it may result in flash over time due to Strong field pressures on the spacer interface. The high voltage junction is created due to electrode, the gas and the solid insulator and the neutral enclosure ends of the support insulator called TJ.High electric field stresses at TJ can cause partial discharges to be initiated, so it is considered a critical area. This results in flashing of the surface along the spacer surface. Spacers are among the most critical key components of GIS. These are accountable for collapse of dielectric Power and memory surface, introducing the want for efficient GIS quality in the development of stable and flashover free spacers. Field One of the field studies along the spacer surface measurements when assessing the efficiency of the spacer. Few researchers examined the quality of different insulator shapes such as smooth disks, corrugated disks and a cone. It is seen that the cone type spacer has considerable potential. Contamination with the insulator weakens the dielectric stress. The main problem considered is the intensification of the field analysis on the surface of the spacer form spacer that is mounted in SF6-gas -insulated system between flanges.

The improved design with the spacer's surface form and slightly changed contact location was successful in reducing the intensification of the local field. In order to improve insulation performance and unwind the electrical field intensity various techniques have been applied in practical gas insulated switch gears [1-6]. A new technique functionally graded materials (FGM) based technique has been implemented in new years. It is suggested to improve the voltage breakdown of the solid insulators, while keeping the structure simple. It is proposed to improve the voltage breakdown of the solid insulators, while keeping the structure simple. Okubo Group suggested the use of

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Applications of Computing, Automation and Wireless Systems in Electrical Engineering pp 383–392

Krill Herd Algorithm for Solution of Economic Dispatch with Valve-Point Loading Effect

Harish Pulluri, N. Goutham Kumar, U. Mohan Rao, Preeti & Mekala Girish Kumar

Conference paper | First Online: 01 June 2019

925 Accesses | **1** Citations

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Abstract

The article presents a novel bio-inspired Krill Herd (KH) algorithm to solve economic dispatch problems. KH algorithm is based on crowding behavior of the krill individuals and achieves a near global optimum solution by using three main actives. The proposed algorithm is tested by considering three and six generating unit systems on different loads on objective function. The attained results have proved that the KH algorithm provides remarkable results as compared with the

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RESEARCH ARTICLE

AN ANALYTICAL STUDY ON NPAS OF STATE BANK OF INDIA

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Non-Performing Assets, State Bank of India (SBI), Merger, RBI Resolutions

Abstract

Objectives: The main objective of this paper is to make an attempt to analytically study the basic reasons for increase in NPAs/analyze gross NPAs in SBI group and the measures taken so far and their impact.

Method: Data is collected for the Variables namely Net Profit Margin, Return on Equity and Return on Assets, Gross NPAs to Gross Advances, Net NPAs to Net Advances, Cost to Income and Provision Coverage Ratio. Secondary data is collected for a period of 5 years i: e from 2014-15 financial year to 2018-2019 Financial Year. Statistical tool like percentage analysis is used to identify the reasons for increase in NPA's of State Bank of India.

Result: It was found in the study that, the major sectors contributed for the increase in NPAs in SBI are mid and Large corporates and not the priority sector. NPAs are increasing from the last five years as shown in the ratios calculated. This is due to change in the method of projecting NPAs and stringent norms by RBI.

Conclusion:The present paper analyzed and identified the reasons for increasing trend of NPAs in SBI group. SBI is in hope that it could see the development in coming years as they are expecting the resolutions for pending cases from the National Company Law Tribunal (NCLT).

Introduction: -

Public banks in India had been facing the problem of stressed assets over the period of time in spite of many resolutions. Recently, Reserve Bank of India came with revised framework for the functioning of banks with respect to stressed assets. RBI has made some stringent norms for the treatment of bad loans. Now it is also planning to ease certain norms (for small and medium enterprises) without diluting the spirit with which it has initiated resolutions. SARFAESI - Securitisation, Reconstruction and Financial Assets and Enforcement of Security Interest Act 2002[2] was a significant step in the reforms in financial sector in India.

As per the reports of Standard and Poor, April 2018, India is in 55th place among the top 100 largest banks in the world in terms of total assets held.

Union cabinet in India has approved the merger of State Bank of India (SBI) with five of its associates in 2017 with an aim to reduce the cost to income ratio, to help Indian economy to rank higher in the global banking rate, to rationalize more resources etc.

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International Journal of Advanced Science and Technology
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A Study on Impact of Working Capital Management on Profitability: A New Dimension from Indian Top Five Cement Companies' Perspective

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Abstract
Management of working capital is considered as a "three faces' coin" with each of inventory management, debtors (debtors + receivables) management along with credit suppliers and short-term lenders management. Still there exists a big tragedy between allocation of permanent (fixed) capital and circulating (working) capital. Even from the inception to incredible operations, firms are undergoing the mismatching status of working capital with respect to operational requirements. The present study encompasses the practical guide of WCM to the small cement producing firms in India, as this study has narrated the working capital policy management of largest cement companies in India. The results revealed that, in order to be considered as biggest companies in the Cement world, the selected firms need to strengthen their working capital position to reap more profits. From the analysis, it is clear that there exist a positive relation exist between profitability and components of WCM.
Keywords: *return on capital employed (ROCE), current ratio, inventory holding period (IHP), debt collection period (DCP), debt payment period (DPP), and net working capital*

1. Introduction –

1.1 Cement Industry [1]India is the silver medalist in production of cement on the globe. Indian cement industry is catering as one of the major industry to the economy and generating employment to more than 10,00,000 people. Since its deregulation, it has attracted a huge amount of FDI from multinational investors. India has a wider scope for its development especially in infrastructure building with the assistance of cement industry. Recent growth prospects like making 98 selected smart cities will push the cement industry in an upward direction.wcm ## working capital management

1.2 Introduction – Working Capital

It is a contest between the fixed capital and working capital allocation. In general lose-lose situations mostly observed repetitively in many of the firms irrespective of the industry nature and size with failure of predicting future conditions of the firm.

Allocation of excessive working capital or conservative working capital leads to collapse of reaching objectives. Hence it is very important to become considered as a financial manager, the optimum allocations by predicting future requirements of the firm along with conditions internally and externally.

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Geethanjali College of Engineering and Technology

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(Accredited by NBA, Approved by AICTE, New Delhi)

Sy.No. 33 & 34, Cheeryal (V), Keesara (M), Medchal District. - 501 301.

Prof. (Dr) S. UDAYA KUMAR
B.E., M.E., M.Tech (Hons.) (New Zealand), Ph.D
PRINCIPAL

To

Smt. Sangeeta Talwar, Sr. Accounts Officer - II,
Govt. of India, Ministry of Defence, Defence R&D Orgnization (DRDO)
Directorate of Extramural Research and Intellectual Property Rights,
5th Floor, Old LASTEC Building, Metcalfe House, Delhi – 110054.
Phone: 011-23818131

3rd March, 2022

Dear Madam,

Subject: Response to your email on "Observation under Equipment Head" dated 24.02.2022 with reference to the submission of documents for 3rd year Release of GIA out of DRDO Project Funds (ERIP/ER/1504754/M/01/1719) – regarding.

With reference to your feedback on the above subject for the project titled "Development of Novel Carbon Nanotube/polymer Nanocomposite Materials for EMI Applications", the following actions were taken by us.

S.N.	Feedback from DRDO	Follow-up action taken by Geethanjali College of Engineering and Technology
1	The carry-forward balance shown under Equipment Head is incorrect. It should be carried forward as per bal. available as on 31.3.21 i.e. Rs. 12659.	It was corrected in the updated Provisional Statement of Expenditure Accounts (attached)
2	In case of Exp. As per Stat. of Accts. is correct i.e. Rs. 2,39,341/-, then submit the Revised ink-signed Equipmer List.	The actual cost of equipment incurred is Rs. 21,55,841/- as mentioned in the already submitted ink-signed Equipment List earlier. So, there is no need of sending a modified equipment list.
3	In case Exp. As per Equipment List is correct, i.e. 21,55,841/- , then refund the differential amount of exce expenditure shown i.e. 83,500/- in favour of CDA (R&D), New Delhi through EMRO instead of DD.	Yes, Expenditure as per Equipment List is correct, i.e. Rs.21,55,841/-; Rs. . 83,500/- was refunded in favour of CDA (R&D), New Delhi through EMRO on 02/03/2022 with SBI Collect Ref. No. DUI6346470. Updated Utilization Certificate and Provisional Exp. Statements are enclosed for the F.Y. 2021-22.

All the above documents are enclosed in triplicate. I request you to kindly release funds for Financial Year 2020-21.

Prof.Dr.S. Udaya Kumar
Principal Investigator

PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

UTILIZATION CERTIFICATE

FOR THE FINANCIAL YEAR 2021-2022 (*From 1-4-2021 to 31-10-2021*)

1.	Title of the Project / Scheme	Development of Novel carbon nanotube/polymer nanocomposite materials for EMI applications
2.	Name of the Institution	Geethanjali College of Engineering and Technology
3.	Principal Investigator	Prof. S.Udaya Kumar
4.	DRDO Letter No. and date of sanctioning the project Date of Start of the Project	ERIP/ER/1504754/M/01/1719 Date 2-4-2018 20-7-2018
5.	Head of account as given in the original sanction letter	**Major Head – 2080** **Minor Head – 004**
6.	Amount brought forward from the previous financial year quoting DRDO letter No & date in which the authority to carry forward the said amount was given	Rs. 84,460/-
7.	Amount received during the financial year (Please give no. and date of DRDO sanction letter for the amount)	NIL
8.	Amount of interest accrued, if any, from the grants	Rs. 2,804/-
9.	Total amount that was available for expenditure (excluding commitments) during the financial year (SL. No 6 +7+8)	Rs.87,264/-
10.	Actual expenditure (excluding commitments) incurred during the financial year (upto .....)	Rs.2,51,014/-
11.	Balance amount available at the end of the financial year.	Rs. – 1,63,750/-
12.	Unspent balance refunded, if any (Please give details of Cheque No. etc.)	NIL
13.	Amount allowed to be carried forward to the next financial year	NIL

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Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(contd...)

UTILIZATION CERTIFICATE

FY 2021-2022 (From 1-4-2021 to 31-10-2021)

Certified that sum of Rs.7.98 lakh was sanctioned as grants-in-aid during the Year 2019-2020 in favour of Geethanjali College of Engineering and Technology. Instt) vide DRDO letter No. ERIP/ER/1504754/M/01/1719 dated 2-4-2018. A sum of Rs. 7.98 lakh released vide Letter No. ERIP/ER/1504754/M/01/1719 dated 24-11-2020, an amount of Rs. 2,804 /- accrued as interest (if any) during the year and Rs. 84,460/- on account of unspent balance of the previous year, and fund available for the current financial year is Rs.87,264/- and a sum of Rs. 2,51,014 /- has been utilized for the purpose for which it was sanctioned and that the balance of Rs. -1,63,,750/- at the end of the year shall be adjusted toward the grants-in-aid payable (as sanctioned.) during the year i.e. 2020-21.

Prof. Dr. S. UDAYAKUMAR
Principal Investigator
4/3/2022

Accounts/Finance Officer
B. Malleshom

Administrative Authority
(with official seal)
PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

2. Certified that I have satisfied myself that the conditions on which the grants- in-aid was sanctioned have been fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

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Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

AUDITED/PROVISIONAL STATEMENT OF EXPENDITURE ACCOUNTS

FOR THE FINANCIAL YEAR 2021-2022 (1-4-2021 to 31-10-2021)

(a) Title of the Project: Development of Novel carbon nanotube/polymer nanocomposite materials for EMI applications
(b) Sanctioned letter no. & date: ERIP/ER/1504754/M/01/1719, Date: 2-4-2018
(c) Principal Investigator: Prof. S. Udaya Kumar
(d) Date of Start of the Project: 20-7-2018
(e) Total Sanctioned cost of the Project: in Rs.45.81 lakh
(f) Grant received (Rs.) in I yr. Rs.30.39 lakh II yr 7.98 lakh III yr --
(g) Total Grants received so far: Rs. 38.37 lakh

S No.	Sanctioned Heads	Funds Sanctioned for the year (third year) in Rs. Lakhs	Funds released (3rd year) Rs. lakh	Carried forward from Previous year Rs.	Funds available (iv+v) Rs	Expenditure incurred during the FY Rs.	Balance (vi-vii) Rs	Commitments Rs	Total expenditure (vii+ix) Rs
i	ii	iii	iv	V	vi	vii	viii	ix	X
(a)	Staff	3.90	-	-226435	-226435	124000	-350435	39565	163565
(b)	Equipment	--	--	12659	12659		12659	12659	12659
(c)	Operation & Maint.	--	--	-	0		0	0	0
(d)	Expendables	2.50	-	147168	147168	36240	110928	360928	397168
(e)	Travel	0.50	-	62146	62146		62146	112146	112146
(f)	Contingencies	0.25	-	23984	23984		23984	48984	48984
(g)	Research Consultant	0.29	-	58000	58000		58000	87000	87000
(h)	Procured Service	--	--	-	0		0	0	0
	Institutional over head	0	-	39000	39000	0	39000	39000	39000
	Interest (earned from 01/4/2021 to 31/07/2021)		2804	4470	7274		7274	7274	7274
	16/9/2020: returned excess JRF HRA @6% to DRDO (R&D)			-36532	-36532		-36532	-36532	-36532
	Interest returned Rs.7274 (from 31/4/2020 to 31/7/2021) to DRDO					7274	-7274	-7274	0
	Refund of Equipment Budget Dt.02/3/2022 SBI Collect Ref No DU16346470					83,500	-83500	-83500	83,500
	TOTAL	7.44	2,804	84460	87264	251014	-163750	580250	831264

Name and Signature of Principal Investigator
Prof. S. UDAYA KUMAR
Date: 4/3/2022

Name and Signature of Accounts Officer
Date: 03/03/2022
B. Malleshwara

Signature of Administrative Authority
Date: 4/3/2022
PRINCIPAL
Geethanjali College of Engg. and Tech.
Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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SBI

रक्षा लेखा महानियंत्रक
Controller General of Defence Accounts
रक्षा मंत्रालय, भारत सरकार
Ministry of Defence, Govt of India

e-Military Receivable Order (e-MRO)

SBI CMPOC, Survey no 26 , Gachibowli , Hyderabad-500019
Date: 02-Mar-2022

e-Receipt for State Bank Collect Payment

SBCollect Reference Number	DUI6346470
Bank Reference Number	CHI8221630
Category	PCDA R AND D NEW DELHI - UNITS
Name of Office/Sub off to which eMRO relates	DCDA R and D Delhi
Name of the Organisation	DRDO
Name of the Unit	Dte of ER AND IPR
Postal Address	5th Floor Old LASTEC Building Metcalfe Road Delhi
Nature of Payment	MISCELLANEOUS
Reference No.	1719
AMOUNT IN RS. (ROUNDED)	83500
Transaction charge	0.00
Total Amount (In Figures)	83,500.00
Total Amount (In Words)	Rupees Eighty Three Thousand Five Hundred Only
Remarks	Towards refund of Equipment budget for the project titled Development of Novel Carbon Nanotube/polymer Nanocomposite Materials for EMI Applications
Notification 1	
Notification 2	

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OFFICE OF THE TEQIP - III
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Govt. Act No.30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

PROJECT COMPLETION CERTIFICATE

SUB: - Project completion certificate – refund of unspent balance upon submission of Utilization Certificate.

Sir/Madam,

It is acknowledged that the project sanctioned to

1. **D. Mohan**, Sreenidhi Institute of Science & Technology
2. **Dr. K. Anitha Sheela**, JNTUH College of Engineering Hyderabad
3. **Mr. P. Sudhakar**, Geethanjali College of Engineering and Technology

With **Procs No.JNTUH/TEQIP-III/CRS/2019/ECE/07** dated on **22-07-2019** under collaborative Research scheme; TEQIP-III JNTUH is completed. Out of the sanctioned amount of Rs **2,99,000/-**, utilized amount (including Interest) is Rs **3,01,061/-** and unspent amount for Rs **NIL** is refunded. In this connection Utilization certificate is submitted by Investigators in compliance to the above.

18/05/21

REGISTRAR

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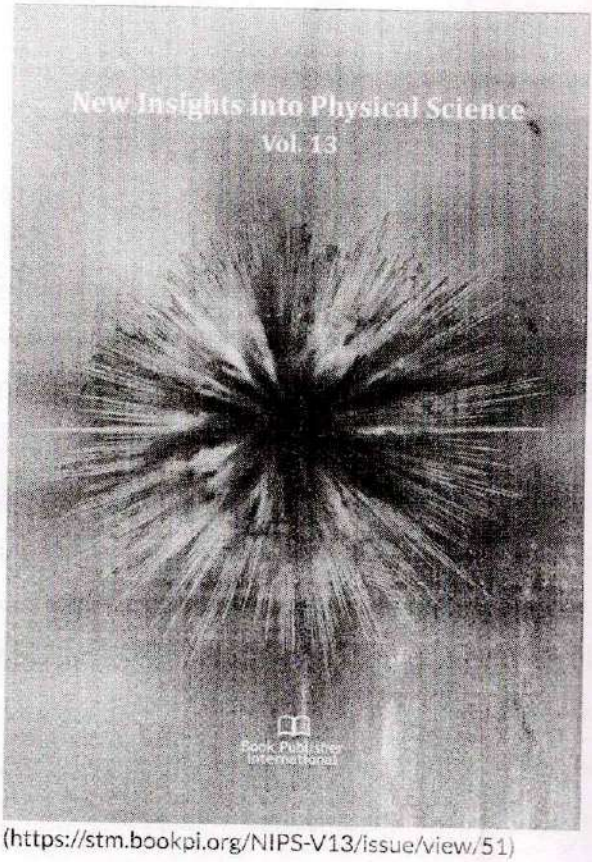
New Insights into Physical Science Vol. 13

(https://stm.bookpi.org/NIPS-V13/index)



(https://stm.bookpi.org/NIPS-V13/issue/view/51)

(https://stm.bookpi.org/NIPS-V13/issue/view/51)

A Frame Work for Decimal Floating Point Multiplier Using Vinculum Multipliers

G. Sreelakshmi ; Kaleem Fatima ; B. K. Madhavi

New Insights into Physical Science Vol. 13, 27 February 2021, Page 152-162
https://doi.org/10.9734/bpi/nips/v13/6866D (https://doi.org/10.9734/bpi/nips/v13/6866D)
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IETE JOURNAL OF RESEARCH
https://doi.org/10.1080/03772063.2021.1951366

A Novel MAC Protocol with Fusion Center and Adaptive Full-Duplex Communication for Cognitive Radio Networks

Appala Raju Uppala [1,2], C. Venkata Narasimhulu [3] and K. Satya Prasad [4*]

[1]Department of ECE, Jawaharlal Nehru Technological University, Kakinada, India; [2]Geethanjali College of Engineering and Technology, Hyderabad, India; [3]LORDS Institute of Engineering and Technology, Hyderabad, India; [4]Vignan's Foundation for Science, Technology & Research, Guntur, India

ABSTRACT

Cognitive radio network is an intelligent and adaptive communication technology used to effectively utilize the radio spectrum to provide better communication. It enables the secondary (unlicensed) users to communicate over vacant channels without disrupting the communication of the primary (licensed) users. This paper proposes a novel contention-free MAC protocol for full-duplex and half-duplex cognitive radio networks. A novel concept of a fusion center-based channel allocation scheme is proposed to provide better channel allocation and reduced energy consumption. The proposed technique is compared with the existing techniques in terms of the average number of channels being sensed by each user, average wait time, collisions, throughput, and average energy consumption. The number of collisions increases as the maximum allotted time of communication increases in existing approaches. The experiment is performed with 20, 40, 60, and 80 s. The existing approaches show for 20 s, the number of collisions is 65, 61, 68, and 62; for 40 s, the number of collisions is 93, 96, 95, and 92; for 60 s, the number of collisions is 122, 126, 133, and 130; for 80 s, the number of collisions is 176, 170, 173, and 175. The proposed method approaches the number of collisions will become zero as the maximum allotted time of communication increases. The experimental results show that the proposed approach performs better than existing approaches. Moreover, it can be observed that the average waiting time of secondary users when a collision occurs is reduced with the application of a fusion center-based channel allocation scheme.

KEYWORDS

Cognitive radio network; Dual-threshold; Full-duplex; Fusion center; Half-duplex; MAC protocol; Spectrum sensing

1. INTRODUCTION

The traffic encountered by the current day cellular network is huge due to the sharp increase in the use of mobile devices. This phenomenon raised attention towards determining appropriate outcomes for better usage of the spectrum. The cognitive radio network (CRN) and full-duplex (FD) mode of communication can provide an effective solution to the growing traffic and achieve maximum spectrum utilization [1]. These technologies majorly concentrate on increasing the utilization of the spectrum and efficiency of the network. Research has to be carried out on adaptive broadcasting techniques at the physical and MAC layers in both traditional networks and cognitive radios.

Generally, the CRN is non-time slotted. Hence, the transmission over the channels need not be continuous. The users can become active at any point of time after being inactive. Classical spectrum sensing strategies like listen before talk (LBT) is example of non-time slotted networks. Such techniques generally fail to transmit the data without collisions in turn reducing the integrity of the model. This leads to collisions on a large scale when the primary users take over the channel or become active. Some of the studies in [2–5] projected the FD spectrum sensing for resolving this issue. In such approaches, the broadcasting secondary user maintains the sensing of the licensed users steadily all along the broadcasting slot, and after identifying the signal of the licensed user, the transmission gets paused to avoid collision [2]. Such techniques increase the security risks and thus the throughput of the system reduces as the collision causes the data corruption and the sender has to resend the data.

The dynamic utilization of the spectrum provided by the CRN has proved to be useful in allotting the spectrum effectively to the secondary users' (SUs) when the channels are idle [6, 7]. False detection of the channels will lead to the collision on the return of the primary users' (PUs) [8]. To improve the performance of the CRN sys-

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Design Engineering

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Brain Tumor Segmentation, Detection and Grading in MRI Images

Kethu Sneha Latha[1] Yepuganti Karuna[2] Saladi Saritha[3]

[1,2]School of Electronics and Communication Engineering, Vellore Institute of Technology, Vellore,
[3]Geethanjali College of Engineering and technology, Hyderabad, Telangana.

E-mail: kethusnehalatha@gmail.com[1], karun@vit.ac.in[2], saritha.saladi3188@gmail.com[3]

Abstract:

The most common malignant brain tumours are gliomas, and they come in a variety of grades, each of which has a significant impact on the patient's chance of survival. Magnetic resonance imaging (MRI) tumour grading and segmentation are normal and crucial for treatment preparation and diagnosis. A deep learning approach was developed to meet this clinical need, that associates tumour segmentation using U-net which is a convolutional neural network (CNN) and tumour grading using transfer learning using a Vgg19 and a completely associated classifier. T1-postcontrast, FLAIR and T1-precontrast MRI images of 110 patients with LGG were used to train and evaluate. DSC for segmentation model's and tumour detection accuracy are 0.875 and 0.937, correspondingly. At the MRI image level, the grading model classifies LGG with specificity, accuracy, sensitivity, and of 0.922, 0.907, and 0.893, correspondingly. In MRI images this study shows conventional tool for automated and simultaneous LGG tumour segmentation, detection, and grading in clinical settings.

Keywords: *Glioma, Segmentation, Magnetic resonance imaging, Classification, Grading, Brain tumor.*

I. INTRODUCTION

The most common malignant brain tumours are gliomas [1], through various grades based on tumour malignancy and growth rate [2]. Gliomas are categorised by the World Health Organization (WHO) into four grades [2,3]. Astrocytoma, oligoastrocytoma, and oligodendroglioma are some of the histological types of LGG. Grades of gliomas, as well as tumour location, shape, and size, are crucial in determining existence and treatment options [4]. As a result, designing conventional techniques to automate tumour segmentation and grading to improve patient results would be advantageous.

MRI is a non-invasive brain imaging technique that can deliver accurate images of the brain. As a result, it's widely used for tumour characterization and diagnosis. Brain tumour segmentation

International Journal of Numerical Modelling
Electronic Networks, Devices and Fields

RESEARCH ARTICLE

Carrier transport mechanism in bottom gate thin-film transistor with SnO as active layer for CMOS displays

Vallisree Sivathanu, Trupti Ranjan Lenka ✉, Vishal Goyal, Hieu Pham Trung Nguyen

First published: 11 November 2021
https://doi.org/10.1002/jnm.2975

Abstract

In this work, we report on four tin monoxide (SnO) thin-film transistor (TFT) grain boundary (GB) models of carrier transport considering the native defects in the thin film, interface traps, and GB deep/tail states. The changes in the activation energy and the GB barrier potential on the application of gate electric field are thoroughly investigated. The shift in Fermi level and the charge carrier transport mechanisms are examined for the two-channel model by the application of external potential. Four models are developed to study the impact of phase transformation of SnO material on the TFT characteristics. Among the four developed models which are considered as four different cases, Case (iv) shows excellent performance and the simulation results revealed that the location of Fermi level closer to the mid gap are suggested to favor the ambipolar behavior. Also, the influence of SnO material thickness and the effect of different dielectrics on the ambipolar device characteristics are examined aiming at optimized performance of the device. The developed optimized model will help the process engineers in tuning the SnO material parameters for achieving better performance in both p-type and n-type TFTs when employed in CMOS based displays.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Original Contribution | Published: 08 October 2021

Implementation of an Adaptive Neural Network-Based Controller for Improving the Conversion Efficiency of Solar Photovoltaic Module

Kakarla Deepti, P. Srihari & K. Manjunath Achari

Journal of The Institution of Engineers (India): Series B
103, 477–489 (2022)

Abstract

This research article proposes an intelligent artificial neural network-based fuzzy logic controller developed for tracking the exact maximum power point (MPP) under varying conditions of temperature and irradiance. The hybrid soft computing method combines learning abilities of an adaptive artificial neural network (ANN) and incremental conductance algorithm (INC)-based fuzzy logic controller (FLC) to handle uncertain data. The adaptive neural fuzzy inference system (ANFIS) is trained with the dataset generated for output voltage, current and all possible varying conditions to estimate the duty cycle of converter as maximum power point capturing device. ANFIS is developed in Takagi–

ARCHIVES

Implementation of MAC Protocol for Analysis of Traffic in Smart Cities

Appala Raju. Uppala, C. Venkata Narasimhulu and K. Satya Prasad

Abstract

Human beings made Smart Transportation system as an essential need in their daily activity in the present era. For avoiding the road accidents in the present busy lives, it is necessary to create an application which is capable of transferring the emergency information between the vehicle and roadside units. This paper explains such network. The betterment of safety and no safety message delivery will be done by the MAC protocol. Threats occurring with 802.11p MAC protocol will be observed here. Hybrid MAC is capable of accessing two channels simultaneously, so that it can provide better performance during increased traffic load. MAC layer protocol is a challenging architecture for the vehicular network system. It is because of frequent changes in the topology of the vehicular network, huge quality of service requirements, infrastructure inadequacy, and automobile nodes during high speed. If the position of the vehicle is nearer to the network then the operation of the algorithm begins. New vehicles generate the request for sending the message. If there is any availability of the channel, then the channel is allocated and initiates the communication. If it is an old vehicle then it directly goes to the communication monitoring. The vehicle will be in a queue position if there is no availability of channels. When the channel becomes free then it gives first priority to the vehicles which are in the queue. The main aim of the Hybrid MAC protocol is to ensure that all vehicles get a proper channel accessing for conveying their message. Hybrid MAC is capable of reducing the loss of packet, delay in overall function, and collision reduction.

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Pages: 1349-1357

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International Journal of Energy Research / Volume 45, Issue 7 / p. 10527-10537

RESEARCH ARTICLE

Modeling and performance optimization of two-terminal Cu_2ZnSnS_4–silicon tandem solar cells

Vallisree Sivathanu, Thangavel R, Trupti Ranjan Lenka ✉

First published: 14 February 2021
https://doi.org/10.1002/er.6540
Citations: 1

Summary

A dual-junction Cu_2ZnSnS_4–Silicon (CZTS–Si)-based tandem configuration is modeled and analyzed for its viability as a solar cell. The top and bottom modules in the tandem structure are validated by comparison with experiment. Initially, the designed tandem structure yields very low efficiency of 3.18%, and the various loss mechanisms are identified and investigated. The current mismatch between top and bottom cells and parasitic absorption (photon losses) are suggested to be the major causes limiting the short circuit current and hence the efficiency of the device. We optimize the material parameters within experimentally achievable limits in order to obtain current matching, and the optimized thicknesses of copper zinc tin sulfide (CZTS) and silicon (Si) absorbers are found to be 150 nm and 250 μm, respectively. The simulation results revealed that the photon losses are reduced, and overall absorption in the longer wavelength region has enhanced with the replacement of cadmium sulfide (CdS) by zinc sulfide (ZnS) buffer and careful optimization of the front layers of the device. The maximum predicted efficiency of tandem structure is >20% by minimizing the recombination centers within the experimentally obtainable ranges and improving the carrier separation process.

Open Research

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Citing Literature

Original Research Article | Published: 21 February 2022

Modeling and Simulation of CZTS Thin-Film Solar Cell for Efficiency Enhancement

Rabin Paul, S. Vallisree, T. R. Lenka ✉ & F. A. Talukdar

Journal of Electronic Materials **51**, 2228–2235 (2022)

Abstract

CZTS solar cells have been utilized as a replacement for CIGS and CdTe solar cells in thin-film technology. With the better absorption coefficient of this material, it has achieved efficiency higher than 13%. In this work, the performance of a CZTS thin-film solar cell (TFSC) is analyzed by replacing intrinsic ZnO (i-ZnO) with Mg-doped ZnO as window layer material. i-ZnO has good optical and electrical characteristics, but the optical, electrical,

Improved Convolutional Neural Network Based Cooperative Spectrum Sensing For Cognitive Radio

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Abstract

Cognitive radio systems are being implemented recently to tackle spectrum underutilization problems and aid efficient data traffic. Spectrum sensing is the crucial step in cognitive applications in which cognitive user detects the presence of primary user (PU) in a particular channel thereby switching to another channel for continuous transmission. In cognitive radio systems, the capacity to precisely identify the primary user's signal is essential to secondary user so as to use idle licensed spectrum. Based on the inherent capability, a new spectrum sensing technique is proposed in this paper to identify all types of primary user signals in a cognitive radio condition. Hence, a spectrum sensing algorithm using improved convolutional neural network and long short-term memory (CNN-LSTM) is presented. The principle used in our approach is simulated annealing that discovers reasonable number of neurons for each layer of a completely associated deep neural network to tackle the streamlining issue. The probability of detection is considered as the determining parameter to find the efficiency of the proposed algorithm. Experiments are carried under different signal to noise ratio to indicate better performance of the proposed algorithm. The PU signal will have an associated modulation format and hence identifying the presence of a modulation format itself establishes the presence of PU signal.

Keywords: Cognitive radio, Cooperative spectrum sensing, Primary user, Simulated annealing, Neural network.

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Micro and Nanoelectronics Devices, Circuits and Systems pp 227–236

Performance Analysis of HIT-CZTS Tandem Solar Cell Towards Minimizing Current Losses

Sivathanu Vallisree & Trupti Ranjan Lenka

Chapter | First Online: 10 September 2021

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 781)

Abstract

In this work, we report on Heterojunction with intrinsic thin layer-Cu_2ZnSnS_4 (HIT-CZTS) tandem solar cell modelled using Silvaco TCAD simulator. Initially the HIT and the CZTS solar cells are modelled and validated. Then the tandem structure is designed using HIT as bottom module and CZTS as top module and various loss mechanisms are investigated. From the simulation study, it is revealed that current mismatch among the top and bottom modules has contributed to low short-circuit current density and hence the efficiency of

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Volume 71, November 2019, 102890

Test pattern generation using thermometer code counter in TPC technique for BIST implementation

K. Jamal [a], K. Manjunatha Chari [a], P. Srihari [b]

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https://doi.org/10.1016/j.micpro.2019.102890

Abstract

This paper introduces a newly pattern generation with Test-Per-Clock technique for Built-In-Self-Test implementation. This proposed test vector generation generates Multiple Single Input Change vectors. Each pattern enforced in SIC vector as scan chain. To generate minimal transition sequence of test patterns, a scalable SIC counter and Thermometer Code Counter implemented. The proposed Multiple SIC vector generator is adaptable to both Test-Per-Scan, Test-Per-Clock techniques. This method developed a theory to evaluate MSIC scheme. Survey outcome demonstrates that, applying Multiple SIC test patterns on ISCAS C432 benchmark reduces the power consumption due to uniform distribution and lesser transition generated test patterns.

Previous Next

Keywords

Test-Per-Scan (TPS); Design under test (DUT); Multiple SIC (MSIC); Thermometer Code Counter (TCC); Test-Per-Clock (TPC)

Original Paper | Published: 06 September 2021

The stability, structural, electronic, and optical properties of hydrogenated silicene under hydrostatic pressures: a first-principle study

V. Kumar & R. Santosh

Journal of Molecular Modeling **27**, Article number: 278 (2021)

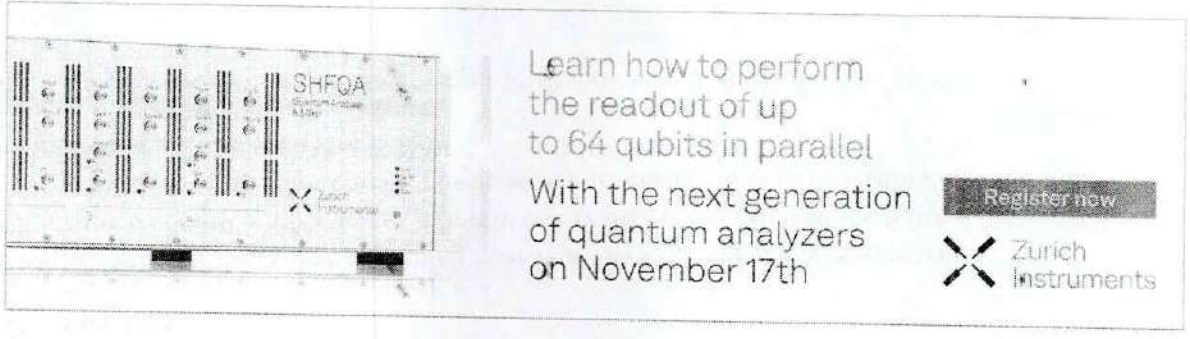
Abstract

The structural, electronic, and optical properties of hydrogenated silicene have been studied under different hydrostatic pressures using first-principle calculations. The binding energy and band structure have been calculated for chair (C-) and boat (B-) structures, which are having good stability at 0 GPa, 3 GPa, 6 GPa, 9 GPa, 12 GPa, 15 GPa, and

Insulation integrity of grading high insulating spacer with functionally graded material in a Gas Insulated Busduct

Cite as: AIP Conference Proceedings **2269**, 030039 (2020); https://doi.org/10.1063/5.0019505
Published Online: 12 October 2020

A. Rukmananda, G. V. Nagesh Kumar, M. Aruna Bharathi, and Sravana Kumar Bali



Insulation Integrity of Grading High Insulating Spacer with Functionally Graded Material in a Gas Insulated Busduct

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Abstract. High voltage power equipment is becoming more compact and under high stress, resulting in loss of insulation. The construction of insulators plays a vital role in enhancing the system's reliability. For GIS, the solid supporting structures called spacers are vulnerable to increased stress and are concerned about their functionality. The point of contact of the conductor, gas and spacer called the triple point junction in the air-insulated bus duct is a highly stressed area and is responsible for significant insulation failures. GIS switchgear design requires comprehensive field distribution in the supporting structures called spacers, which is critical for the system's healthy operation. In this paper, high grade material is used for post form spacers with specific permittivity for controlling field stress distribution on the spacer surface. Electric field calculations for different grades are calculated and compared and the stress reduction is carried out with the insertion of metal inserts.

INTRODUCTION

Gas Insulated Busduct (GIB) is becoming the most popular technology in India due to its compactness, ideal use in restricted areas. The high demand for electrical power and energy efficiency in urban areas made it necessary for power consumers to boost the voltage network. Gas Insulated Busducts provides an excellent alternative to the above-mentioned issue and have been operating around the globe for over 30 years. The most challenges faced by the GIB is failure of Insulating spacers as they are the weakest insulating link (weak link) and they can lose their strength due to corona effect or metallic particles. The rapid rise in the power density of electrical equipment and electronic equipment highlights the need for thermally conductive but electrically insulating products. The surges or any event of flashovers will damage of spacer and hence a spacer material has to be chosen to get rid of these situations in regular testing in plant or onsite. It is enormously essential as SF6 systems should be viewed as self-restoration. Cycloaliphatic resins consist of greater track resistance when compared with biphenyl resins with reduced mechanical strength. Aluminum-based fillers along with epoxy resins are used to create general strength even though they have a demerit of greater allowability and greater thermal expansion coefficient. Due to the defects like protrusions, voids, depressions, cracks, delaminations and poor adherence to electrodes the life of the spacer can be decreased as the conductor is positioned in the middle of the spacer. From the survey of GIB used in the context of India it was observed that the maximum rate of its failures is because of material failures, improper selection of materials. Few other reasons like corrosion, loose particles effect the overall failures in the GIB.

This work focuses on design of Optimal Spacer in GIB using various insulating materials and analysis will be carried by determining electric breakdown strength, thermal conductivity, temperature resistance, corona resistance, and specific energy storage in dielectrics. Later, design of disc type and cone type FGM (Functionally Graded

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Synthesis and charecterization of $LiMn_{1.5}Ni_{0.5}O_4$ by sol-gel method for cathode material & it's application in Li-ion battery

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Synthesis and charecterization of $LiMn_{1.5}Ni_{0.5}O_4$ by sol-gel method for cathode material & it's application in Li-ion battery

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Subhashini Vedala, M. Sushama, and M. Aruna Bharathi

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Analyzing and Predicting Cyber Security Violations using Machine Learning Techniques

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Abstract *— To deepen our insight into the evolution of a threat situation, study of cyber incident data sources is an essential process. This is a relatively recent subject for science and many experiments still have to be conducted. Throughout this article, we present statistical analysis of the 12-year cyber hacking operation (2005-2017) violation incident data set which includes attacks by malware. We prove that, in comparison to the literary results, breach sizes and inter-arrival times for hacking breaches can be modeled instead of distributions, since they have an auto-correlation. In order to adapt the time of the intercom and the scale of the violation, we suggest complex stochastic process models. We also prove that the inter arrival periods and the violation scale can be estimated from these models. We perform quantitative and qualitative pattern research on the data set to achieve a better understanding of the growth of hacking infringement incidents. We derive a variety of observations into cyber security, including the challenge of cyber hacking in its scale, but not in its severity.*

Keywords: Cyber risk analysis, Hacking breach, breach prediction, data breach cyber threats, trend analysis, cyber security data analytics and time series.

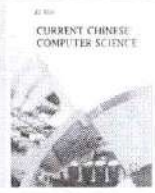
Introduction

An information breakdown is the protection for the transfer, transmission, stolen or as any use of important, safe or confidential information by an unapproved person. The breakdown of data is the purposeful or unintended intrusion into a non-trustworthy realm of safe or private/classified data. This

Current Chinese Computer Science, 2021, *1*, 61-76

RESEARCH ARTICLE

Leaf Image Classification with the Aid of Transfer Learning: A Deep Learning Approach



Srinivasa Rao Dammavalam[1,*], Ramesh Babu Challagundla[2], Vangipuram Sravan Kiran[1], Rajasekhar Nuvvusetty[3], Lalith Bharadwaj Baru[1], Rohit Boddeda[4] and Sai Vardhan Kanumolu[1]

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Abstract: ***Background*:** Crop diseases are a primary hazard to nutrient safety, which proves to be a serious problem in many places in the world due to the unavailability of essential aid. Typically agriculturalists or specialists perceive the plants with a naked eye for detection and identification of an illness. Machine vision models, in specific Convolutional Neural Networks (CNNs) have directed an impact in feature extraction to a greater extent. Since 2015, numerous solicitations for the automatic classification and recognition of crop illnesses have been established.

***Methods*:** In this paper, we proposed, analyzed, and assessed various state-of-the-art models proposed over a decade. These models are pre-trained with the finest parameters where we modeled a design-oriented method with numerous leaf-images and classified them into infection and healthy class for each type of leaf independently.

***Results*:** Through our examination, we concluded that VGG models stand-alone with many cited prototypes and give on par results. As declared, these VGG models (VGG16 and VGG19) are utilized for feature extraction, and further, we augmented a set of dense layers and train them consequently for classification. The performances of various machine vision prototypes were pictorially perceived and their sophisticated architecture is not only capable of extracting detailed features but also repressed many loop-holes. The performance is assessed and computed for several types of leaf images and the accuracy scores attained were more than 97.5% for VGG16 and 96.72% for VGG19.

***Conclusion*:** AUC-ROC curves were portrayed to illustrate its inspiration in defining an accurate classification where VGG16 and VGG19 have at least 96.6% and 95% area under the curve (AUC) which resembles their robustness.

ARTICLE HISTORY

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Keywords: Leaf classification, deep learning, transfer learning, automated plant diagnosis, CNNs.

1. INTRODUCTION

The trick of competent plant disease fortification is carefully connected to the difficulties of supportable cultivation and weather variation. Investigation outcomes designate that weather variation can change phases and amounts of pathogen improvement; it can also change host confrontation, which leads to physiological variations of host-pathogen connections. The condition is more difficult by the fact that today; diseases are increasing globally. New diseases can transpire in places where they were formerly unknown, where there is no native ability to find proper medication.

Cultivation has a huge impact on the production of food, especially with the increasing population. The plant diseases are intimidating the yield of the crop. Plant diseases can have a major impact on decreasing crop production in farming and forestry. Initial discovery and identification of plant diseases oblige to take suitable actions.

There are numerous methods to identify plant pathologies. Some diseases do not have any noticeable indications related, or appear only when it is too late to act. In these circumstances, it is essential to accomplish refined examination, typically by resources of influential microscopes. In some circumstances, the marks can only be perceived in portions of the electromagnetic band that are not obvious to the naked eye.

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Multi-Otsu's image segmentation for Mammograms using Artificial Bee Colony (ABC) Algorithm

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Abstract:

Clear-cut image segmentation of mammogram images is indispensable in malignant tumor detection. This paper is attempted to propose a nature-inspired optimized method for mammogram image segmentation by adopting Otsu's multi-level thresholding algorithm as a fitness function into the ABC algorithm. Moreover, in image segmentation, Multi-level thresholding algorithms come across with insufficient exploration and low exploitation on search space. Hence, to solve this problem a Metaheuristic optimized algorithm is leveraged. This is achieved by using the ABC algorithm to explore the population space and exploit the specified population space to select the finest threshold values. Thereafter, the output of ABC is used to segment the mammogram image using the multi thresholding method. In this work, the proposed method is exercised with a total of nine images from the MINI MIAS database. Besides, to assess the performance of the proposed method different threshold levels are used to segment mentioned images. It was witnessed that the performance of the wished-for method is effective and efficient to segment the mammogram images in terms of measures like PSNR, SSI, and computational time.

Keywords: Artificial bee colony, Otsu, Multi-level Thresholding, Mammogram, Breast cancer

1. Introduction

1.1 Medical Image Segmentation

Mammogram images are currently most widely adopted technique in clinical practice to detect the breast cancer as it is easily accessible and cost-effective. For early detection of malignant tumors in mammogram images, many methods have been proposed [12]. Breast cancer mainly affects middle-aged women for different reasons. Over the past twenty years, several methods are demonstrated to segment the medical images like X-ray, CT (computed tomography)-scan, Magnetic Resonance Imaging (MRI) Mammogram, etc. [1]. Homogeneous gray level values of pictorial muscle in preprocessed mammogram images exhibits effective intensity. Cancer detection false positive rate depends on the accuracy of image segmentation [16]. Image segmentation increases the visibility of microcalcification in processed mammogram images. In computer vision algorithms image segmentation plays a significant role [6]. There are six types of image segmentation methods, threshold-based, Artificial Neural Network (ANN) based, edge-based, clustering-based, watershed-based, region-based, and PDE-based methods[8]. Thresholding is the most popular segmentation method in medical image processing. In the bi thresholding method, the grayscale image is divided into two intensities i.e forefront and background. But, multi thresholding divides the images into many homogeneous regions [13].

1.2 Otsu's Multi Thresholding

In automatic global threshold case studies, gray level images can be effectively segmented into bimodal (foreground or background) or multi classes using a non-parametric and unsupervised Otsu's thresholding algorithm. It is centered on a very simple idea: exhaustively search for the threshold that reduces the weighted with in class variance defined as $\propto_w^2$ [22]. The class variances are given by (1) and (2) respectively

$$\propto_0^2 = \sum_{i=0}^{n} (i-\mu_0)^2 \Pr(i/C_0) = \sum_{i=0}^{n} (i-\mu_0)^2 p_i/w_0$$

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Three Point Boundary Value Problems Associated with First Order Fuzzy Difference Systems-Existence and Uniqueness via the Best Least Square Solution

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Abstract:
This paper presents a criteria for the existence and uniqueness of solutions to first order fuzzy difference system using QR-algorithm. Modified QR-algorithm is presented for fuzzy linear systems using singular value decomposition.

Keywords: Fuzzy Difference Systems, Modified QR-algorithm, Fundamental matrix, Decode algorithm.

AMS(MOS) classifications 34B15,93B05,93B15

1. Introduction:

Existence and uniqueness of solutions to initial value problems have a long mathematical history going back to Picards. The mere fact that f is continuous on R ensures existence of at least one solution to the initial value problem

$$y^1 = f(t,y), \qquad y(t_0) = y_0 \qquad (1.1)$$

on R. The situation is different for boundary value problems. Length of interval estimates are necessary to prove existence and uniqueness of (1.1). If f satisfies a lipschitz condition in the second variable, then (1.1) has a unique solution. The situation is different for first – order difference system..

$$y_{n+1} = A(n)y_n + f_n, \quad y(n_0) = y_0, \qquad (1.2)$$

where A is an p x p continuous matrix, whose elements $a_{ij}(n)$ are all real or complex valued functions defined on $N_{n_0}^+$ and $y_n \epsilon R^p(C^p)$ with components $y_1(n), y_2(n), \ldots\ldots\ldots y_p(n)$,defined on $N_{n_0}^+$. The corresponding homogeneous equation corresponding to (1.2) is

$$y_{n+1} = A(n)y_n, \quad y(n_0) = y_0 \qquad (1.3)$$

(1.3) possess a unique solution on $N_{n_0}^+$ as can easily be seen by induction.

Information Systems Frontiers
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UnderTracker: Generating Robust Binaries Using Execution Flow Traces

Rajesh Kumar Shrivastava[1] · Chittaranjan Hota[2]

Accepted: 27 November 2020

Abstract

Programs are developed in a manner so that they execute and fulfill their intended purpose. In doing so, programmers trust the language to help them achieve their goals. Binary hardening is one such concept that prevents program behavior deviation and conveys the programmer's intention. Therefore, to maintain the integrity of the program, measures need to be taken to avoid code-tampering. The proposed approach enforces code verification from instruction-to-instruction by using the programmer's intended control flow. *UnderTracker* implements execution flow at the instruction cache by utilizing the read-only data-cache available in the program. The key idea is to place a control transfer code in data-cache and call it from instruction cache via labels. *UnderTracker* injects labels into the binary without affecting the semantics of the program. After the code execution starts, it verifies every control point's legality before passing the control to the next instruction, by passively monitoring the execution flow. We proposed a cache-based monitoring method to verify code integrity. In this, we used side-channel information to monitor the program's execution state. This monitoring system uses a sliding window scheme to detect the violation of code integrity with high reliability. This paper proposes an efficient technique, called *UnderTracker* to strengthen the binary integrity of an I/O intensive running program, with the nominal overhead of only 5-6% on top of the normal execution.

Keywords Superblock · Execution flow verification · Systems security · Cache-based monitoring

1 Introduction

An adversary can tamper code via a malicious form of the binary (executable file) hosted by a third-party. An adversary can also install malicious binary by applying phishing attacks. There are some possible scenarios when code tampering exploits happen listed as follows:

1. An adversary can directly change the application binary through a phishing attack.
2. An adversary can exploit the resource within an application.
3. An adversary can exploit code to inject malicious payload.

The code tampering method leaves an impact on both ways, technical and business. The technological implications of code modification include password leaking, theft of identification, unauthorized modification of code. On the other hand, the firm is also gets affected by revenue loss and damage to reputation.

There are various application programs available over the internet, which contains a malicious payload. For example, games are the most popular in this category. If a user doesn't want to pay for the game, they use some short-tricks to achieve extra power or life. This bypass allows them to enjoy the game without pay. The adversary has also injected spyware to steal user's information in this type of game bypass technique. They can steal your important data like banking id and password.

One of the most lucrative attack vectors present in a binary is the code reuse attack, and therefore it becomes paramount to protect it. Existing protection methods such as stack canaries (Marco-Gisbert and Ripoll 2013), Data Execution Prevention (DEP) and Address Space

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Praise Worthy Prize

International Review on Computers and Software (IRECOS)

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QMCP: QoS Aware Multi-Channel Path Discovery for End to End Data Transmission Over Cognitive Radio Ad Hoc Networks

Nagul Shribala[1], P. Srihari[2], B. C. Jinaga[3]*

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Abstract

ICT (Information and Communication Technology) trends are fast emerging and globally leading to the substantial demand of spectrum channels used for wireless networks. Cognitive Radio (CR) is an emerging technology solution that shall work on dynamic spectrum channel allocation. In cognitive radio ad hoc networks (CRAN), it is often difficult to establish the path among nodes with direct channel. Hence it is obvious to establish the path through the set of channels in sequence. The constraint is quality of service (QoS). Path establishment by the multiple channels in sequence needs a dynamic channel assignment for ensuring an optimum utilization of the available resources, whilst minimizing the interference in a network. In this paper, the emphasis is on Multichannel transmission Path with optimal QoS fitness for Cognitive Radio Networks. The proposed model is called QoS aware Multi-Channel Path (QMCP) discovery for end-to-end data transmission over CRAN. The QMCP performs the evolutions using adaptive genetic algorithm on the initial multichannel paths discovered in order to obtain the best fit path. The QoS metrics defined in our earlier contribution are used in fitness function. Results from the study reflect the robustness of the proposed model which could certainly

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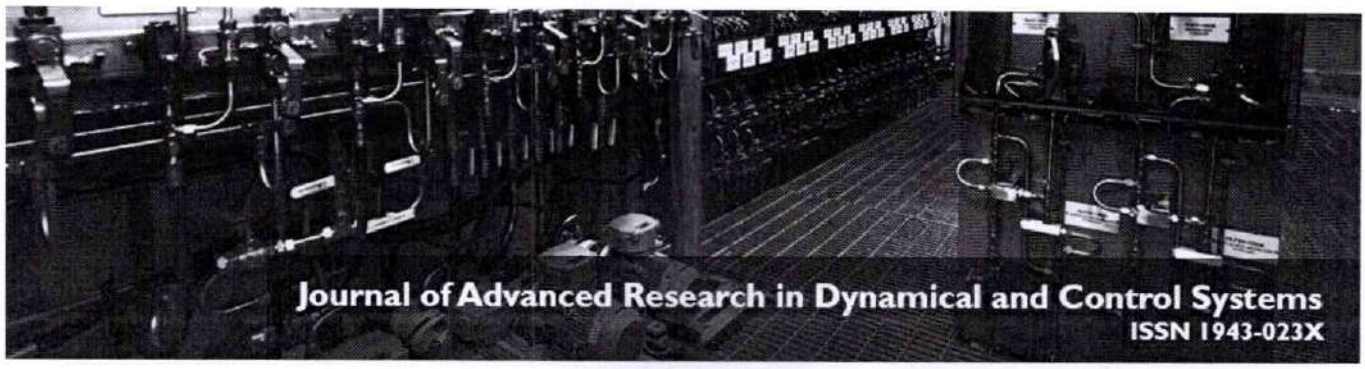

Software Defined Radio with LFSR and Hard Decision based Viterbi Decoder

Alajangi Rama Krsihna, Balaji Narayanam , P. Srihari

Abstract:

This paper describes about Software Defined Radio (SDR) design for the prospect of testing the Bit-Error Rate (BER) and power analysis of digital communication schemes (ASK, FSK, BPSK) using Xilinx system generator. The design was implemented using Xilinx and MATLAB Simulink. This design describes the process of channelization as it exploits to low power and high efficiency applications in communication industry (such as wireless, satellite and cellular systems) and Digital Signal Processors. A SDR is defined as radio in which some or all of the physical layer functions are software defined. The SDR radio frequently has to load various signals depending on their requirements, which may use different source coding, modulation schemes, channel coding and demodulation schemes. The conventional hardware based radio devices have an extent on cross functionality and a slight flexibility in mounting multiple waveform with high hardware cost. This problem is solved by Software Defined Radio (SDR) architecture with Fibonacci Linear Feedback Shift Register and Viterbi Decoder.

Issue: 02-Special Issue

Year: 2018

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Original Paper | Published: 06 September 2021

The stability, structural, electronic, and optical properties of hydrogenated silicene under hydrostatic pressures: a first-principle study

V. Kumar ✉ & R. Santosh

Journal of Molecular Modeling **27**, Article number: 278 (2021)

Abstract

The structural, electronic, and optical properties of hydrogenated silicene have been studied under different hydrostatic pressures using first-principle calculations. The binding energy and band structure have been calculated for chair (C-) and boat (B-) structures, which are having good stability at 0 GPa, 3 GPa, 6 GPa, 9 GPa, 12 GPa, 15 GPa, and

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Thermo-photodynamic perspective of the simultaneous S-Scheme ternary heterostructure through Ag_3VO_4 shuttle for the increased photo-redox ability

Aneek Kuila [a], Santosh Routu [b], Pichiah Saravanan [a] ✉, Chuanyi Wang [c], Detlef Bahnemann [d, e]

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https://doi.org/10.1016/j.apmt.2022.101435

Highlights

- A hierarchical directional heterojunction among $InVO_4$-Ag_3VO_4-gC_3N_4 was synthesised.
- DFT calculation revealed the agnostic interaction where Ag_3VO_4 acted as a bonding bridge and charge-transfer mediator.
- Induced redox ability of the constituents increased the thermo-photocatalytic property.
- A simultaneous S-scheme charge transfer is observed during the exciton transfer.

Abstract

A binary heterostructure bearing Ag_3VO_4 and $InVO_4$ is deposited over a 2D gC_3N_4 nano-bed through a multistep hydrothermal technique. Though the synthesis is non-directional, the formation of the junction is governed through Ag_3VO_4 acting as a shuttle for charge transfer between $InVO_4$ and gC_3N_4. Vacant d-orbital in the Ag_3VO_4 accommodated the incoming ⊡ electrons from gC_3N_4 forming a covalent bond through Agostic interactions and was as

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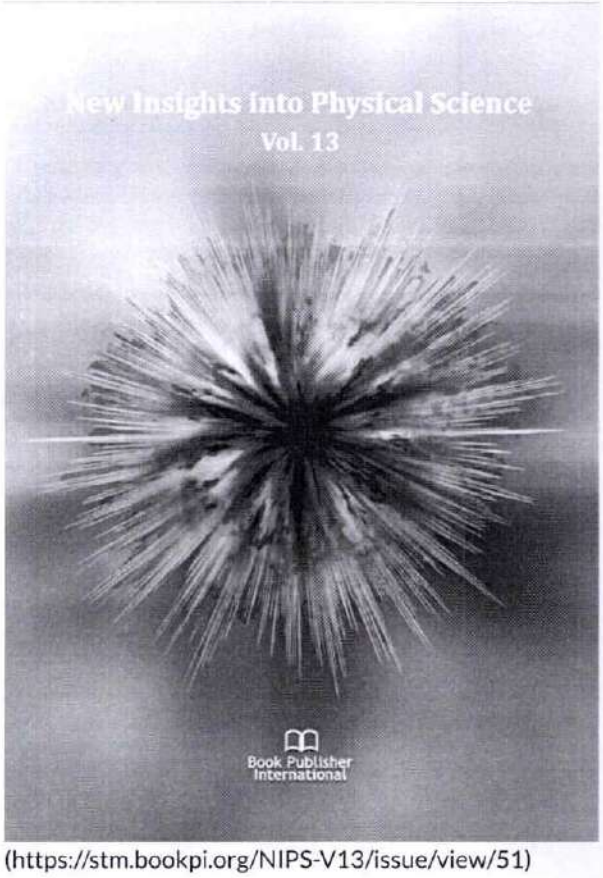

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A Frame Work for Decimal Floating Point Multiplier Using Vinculum Multipliers

G. Sreelakshmi ; Kaleem Fatima ; B. K. Madhavi

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A Novel MAC Protocol with Fusion Center and Adaptive Full-Duplex Communication for Cognitive Radio Networks

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ABSTRACT

Cognitive radio network is an intelligent and adaptive communication technology used to effectively utilize the radio spectrum to provide better communication. It enables the secondary (unlicensed) users to communicate over vacant channels without disrupting the communication of the primary (licensed) users. This paper proposes a novel contention-free MAC protocol for full-duplex and half-duplex cognitive radio networks. A novel concept of a fusion center-based channel allocation scheme is proposed to provide better channel allocation and reduced energy consumption. The proposed technique is compared with the existing techniques in terms of the average number of channels being sensed by each user, average wait time, collisions, throughput, and average energy consumption. The number of collisions increases as the maximum allotted time of communication increases in existing approaches. The experiment is performed with 20, 40, 60, and 80 s. The existing approaches show for 20 s, the number of collisions is 65, 61, 68, and 62; for 40 s, the number of collisions is 93, 96, 95, and 92; for 60 s, the number of collisions is 122, 126, 133, and 130; for 80 s, the number of collisions is 176, 170, 173, and 175. The proposed method approaches the number of collisions will become zero as the maximum allotted time of communication increases. The experimental results show that the proposed approach performs better than existing approaches. Moreover, it can be observed that the average waiting time of secondary users when a collision occurs is reduced with the application of a fusion center-based channel allocation scheme.

KEYWORDS

Cognitive radio network; Dual-threshold; Full-duplex; Fusion center; Half-duplex; MAC protocol; Spectrum sensing

1. INTRODUCTION

The traffic encountered by the current day cellular network is huge due to the sharp increase in the use of mobile devices. This phenomenon raised attention towards determining appropriate outcomes for better usage of the spectrum. The cognitive radio network (CRN) and full-duplex (FD) mode of communication can provide an effective solution to the growing traffic and achieve maximum spectrum utilization [1]. These technologies majorly concentrate on increasing the utilization of the spectrum and efficiency of the network. Research has to be carried out on adaptive broadcasting techniques at the physical and MAC layers in both traditional networks and cognitive radios.

Generally, the CRN is non-time slotted. Hence, the transmission over the channels need not be continuous. The users can become active at any point of time after being inactive. Classical spectrum sensing strategies like listen before talk (LBT) is example of non-time slotted networks. Such techniques generally fail to transmit the data without collisions in turn reducing the integrity of the model. This leads to collisions on a large scale when the primary users take over the channel or become active. Some of the studies in [2–5] projected the FD spectrum sensing for resolving this issue. In such approaches, the broadcasting secondary user maintains the sensing of the licensed users steadily all along the broadcasting slot, and after identifying the signal of the licensed user, the transmission gets paused to avoid collision [2]. Such techniques increase the security risks and thus the throughput of the system reduces as the collision causes the data corruption and the sender has to resend the data.

The dynamic utilization of the spectrum provided by the CRN has proved to be useful in allotting the spectrum effectively to the secondary users' (SUs) when the channels are idle [6, 7]. False detection of the channels will lead to the collision on the return of the primary users' (PUs) [8]. To improve the performance of the CRN sys-

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RESEARCH ARTICLE

Carrier transport mechanism in bottom gate thin-film transistor with SnO as active layer for CMOS displays

Vallisree Sivathanu, Trupti Ranjan Lenka ✉, Vishal Goyal, Hieu Pham Trung Nguyen

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Brain Tumor Segmentation, Detection and Grading in MRI Images

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Abstract:

The most common malignant brain tumours are gliomas, and they come in a variety of grades, each of which has a significant impact on the patient's chance of survival. Magnetic resonance imaging (MRI) tumour grading and segmentation are normal and crucial for treatment preparation and diagnosis. A deep learning approach was developed to meet this clinical need, that associates tumour segmentation using U-net which is a convolutional neural network (CNN) and tumour grading using transfer learning using a Vgg19 and a completely associated classifier. T1-postcontrast, FLAIR and T1-precontrast MRI images of 110 patients with LGG were used to train and evaluate. DSC for segmentation model's and tumour detection accuracy are 0.875 and 0.937, correspondingly. At the MRI image level, the grading model classifies LGG with specificity, accuracy, sensitivity, and of 0.922, 0.907, and 0.893, correspondingly. In MRI images this study shows conventional tool for automated and simultaneous LGG tumour segmentation, detection, and grading in clinical settings.

Keywords: *Glioma, Segmentation, Magnetic resonance imaging, Classification, Grading, Brain tumor.*

I. INTRODUCTION

The most common malignant brain tumours are gliomas [1], through various grades based on tumour malignancy and growth rate [2]. Gliomas are categorised by the World Health Organization (WHO) into four grades [2,3]. Astrocytoma, oligoastrocytoma, and oligodendroglioma are some of the histological types of LGG. Grades of gliomas, as well as tumour location, shape, and size, are crucial in determining existence and treatment options [4]. As a result, designing conventional techniques to automate tumour segmentation and grading to improve patient results would be advantageous.

MRI is a non-invasive brain imaging technique that can deliver accurate images of the brain. As a result, it's widely used for tumour characterization and diagnosis. Brain tumour segmentation

Abstract

In this work, we report on four tin monoxide (SnO) thin-film transistor (TFT) grain boundary (GB) models of carrier transport considering the native defects in the thin film, interface traps, and GB deep/tail states. The changes in the activation energy and the GB barrier potential on the application of gate electric field are thoroughly investigated. The shift in Fermi level and the charge carrier transport mechanisms are examined for the two-channel model by the application of external potential. Four models are developed to study the impact of phase transformation of SnO material on the TFT characteristics. Among the four developed models which are considered as four different cases, Case (iv) shows excellent performance and the simulation results revealed that the location of Fermi level closer to the mid gap are suggested to favor the ambipolar behavior. Also, the influence of SnO material thickness and the effect of different dielectrics on the ambipolar device characteristics are examined aiming at optimized performance of the device. The developed optimized model will help the process engineers in tuning the SnO material parameters for achieving better performance in both p-type and n-type TFTs when employed in CMOS based displays.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Original Contribution | Published: 08 October 2021

Implementation of an Adaptive Neural Network-Based Controller for Improving the Conversion Efficiency of Solar Photovoltaic Module

Kakarla Deepti, P. Srihari & K. Manjunath Achari

Journal of The Institution of Engineers (India): Series B
103, 477–489 (2022)

Abstract

This research article proposes an intelligent artificial neural network-based fuzzy logic controller developed for tracking the exact maximum power point (MPP) under varying conditions of temperature and irradiance. The hybrid soft computing method combines learning abilities of an adaptive artificial neural network (ANN) and incremental conductance algorithm (INC)-based fuzzy logic controller (FLC) to handle uncertain data. The adaptive neural fuzzy inference system (ANFIS) is trained with the dataset generated for output voltage, current and all possible varying conditions to estimate the duty cycle of converter as maximum power point capturing device. ANFIS is developed in Takagi–

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RESEARCH ARTICLE

Modeling and performance optimization of two-terminal Cu_2ZnSnS_4–silicon tandem solar cells

Vallisree Sivathanu, Thangavel R, Trupti Ranjan Lenka

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https://doi.org/10.1002/er.6540
Citations: 1

Summary

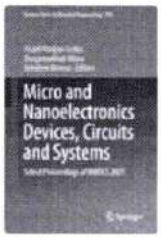
A dual-junction Cu_2ZnSnS_4–Silicon (CZTS–Si)-based tandem configuration is modeled and analyzed for its viability as a solar cell. The top and bottom modules in the tandem structure are validated by comparison with experiment. Initially, the designed tandem structure yields very low efficiency of 3.18%, and the various loss mechanisms are identified and investigated. The current mismatch between top and bottom cells and parasitic absorption (photon losses) are suggested to be the major causes limiting the short circuit current and hence the efficiency of the device. We optimize the material parameters within experimentally achievable limits in order to obtain current matching, and the optimized thicknesses of copper zinc tin sulfide (CZTS) and silicon (Si) absorbers are found to be 150 nm and 250 μm, respectively. The simulation results revealed that the photon losses are reduced, and overall absorption in the longer wavelength region has enhanced with the replacement of cadmium sulfide (CdS) by zinc sulfide (ZnS) buffer and careful optimization of the front layers of the device. The maximum predicted efficiency of tandem structure is >20% by minimizing the recombination centers within the experimentally obtainable ranges and improving the carrier separation process.

Open Research

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Citing Literature



Micro and Nanoelectronics Devices, Circuits and Systems pp 227–236

Performance Analysis of HIT-CZTS Tandem Solar Cell Towards Minimizing Current Losses

Sivathanu Vallisree & Trupti Ranjan Lenka

Chapter | First Online: 10 September 2021

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 781)

Abstract

In this work, we report on Heterojunction with intrinsic thin layer-Cu_2ZnSnS_4 (HIT-CZTS) tandem solar cell modelled using Silvaco TCAD simulator. Initially the HIT and the CZTS solar cells are modelled and validated. Then the tandem structure is designed using HIT as bottom module and CZTS as top module and various loss mechanisms are investigated. From the simulation study, it is revealed that current mismatch among the top and bottom modules has contributed to low short-circuit current density and hence the efficiency of

Improved Convolutional Neural Network Based Cooperative Spectrum Sensing For Cognitive Radio

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Abstract

Cognitive radio systems are being implemented recently to tackle spectrum underutilization problems and aid efficient data traffic. Spectrum sensing is the crucial step in cognitive applications in which cognitive user detects the presence of primary user (PU) in a particular channel thereby switching to another channel for continuous transmission. In cognitive radio systems, the capacity to precisely identify the primary user's signal is essential to secondary user so as to use idle licensed spectrum. Based on the inherent capability, a new spectrum sensing technique is proposed in this paper to identify all types of primary user signals in a cognitive radio condition. Hence, a spectrum sensing algorithm using improved convolutional neural network and long short-term memory (CNN-LSTM) is presented. The principle used in our approach is simulated annealing that discovers reasonable number of neurons for each layer of a completely associated deep neural network to tackle the streamlining issue. The probability of detection is considered as the determining parameter to find the efficiency of the proposed algorithm. Experiments are carried under different signal to noise ratio to indicate better performance of the proposed algorithm. The PU signal will have an associated modulation format and hence identifying the presence of a modulation format itself establishes the presence of PU signal.

Keywords: Cognitive radio, Cooperative spectrum sensing, Primary user, Simulated annealing, Neural network.

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Modeling and Simulation of CZTS Thin-Film Solar Cell for Efficiency Enhancement

Rabin Paul, S. Vallisree, T. R. Lenka ✉ & F. A. Talukdar

Journal of Electronic Materials **51**, 2228–2235 (2022)

Abstract

CZTS solar cells have been utilized as a replacement for CIGS and CdTe solar cells in thin-film technology. With the better absorption coefficient of this material, it has achieved efficiency higher than 13%. In this work, the performance of a CZTS thin-film solar cell (TFSC) is analyzed by replacing intrinsic ZnO (i-ZnO) with Mg-doped ZnO as window layer material. i-ZnO has good optical and electrical characteristics, but the optical, electrical,

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PREDICTION OF BIOACTIVITY OF PHYTOCHEMICALS IN *Anethum graveolens* – AN *in silico* APPROACH

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Original Research Article

ABSTRACT

***Anethum graveolens* is a popular herb widely used as flavouring agent and it yields essential oil. It is rich in polyphenols which exhibit antioxidant and carminative properties. In this work, phytochemical screening is performed to establish the presence of terpenoids, flavonoids and tannins etc. In food products, lipid peroxidation is common and to prevent it synthetic antioxidants like butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT) are used and they are carcinogenic in nature. So, there is an increasing demand for plant derived antioxidants. *Anethum graveolens* is a plant rich in antioxidants and the present study predicts the antioxidant and bioactivity of Limonene, Carvone, α- Phellandrene, Dillapiol, Geraniol and p-Cymene. *Insilico* studies were carried out using PASS prediction tool and the bioactive compounds were predicted with Pa> 0.7. For these compounds, the bioactivity score is calculated and their potential medicinal value is discussed using Lipinski's rule of 5 analysis. From the study, it is observed that all the compounds have bioactivity and are potential antioxidants that may be used in health care, cosmetic and food and beverage industry.**

Keywords: *Anethum graveolens*; bioactivity spectrum; phytochemical screening: bioactivity score; Lipinski rule of 5.

INTRODUCTION

Anethum graveolens (Dill) is an herb that belongs to the family of apiaceae. The genus name *Anethum* is originated from the Greek word aneeson or aneeton, i.e strong smelling. It originates from the Mediterranean and West Asia [1]. *A. graveolens* is popularly known as Dill or shapt. It is cultivated across the world and is known for its flavouring and curative properties. The experimental studies demonstrated the antimicrobial, stomachic, antioxidant, and carminative properties of Dill [2-5]. Flowers and leaves have high content of polyphenols when compared to fruits and hence are used for extracting essential oil.

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A Framework for Developing Intellectual Property Perspective among Computer Science Students

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Abstract

Intellectual property rights are being discussed and have become as policy issues in this era of knowledge. Every organization, industry in every sector is striving hard to protect, create, and convert their intangible assets to tangible ones through intellectual property rights. In this scenario, young students comprising majority work force of information technology field are to be sensitized about intellectual property rights at the beginning of their career. With this background, as a facilitator of this course a frame work was developed to impart intellectual property rights education to computer science students. This paper discusses how students are introduced to concepts in a unit wise manner and as the course makes progress, how challenges are dealt pedagogically to reach the outcomes of the course.

Key words: Intellectual property rights, pedagogy, information technology, learning goals, critical thinking.

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Hard core proof of the polyvinyl alcohol as a reducer for the formation of gold nanoparticles

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ABSTRACT

In this paper, we report the direct synthesis of water dispersed gold nanoparticles encapsulated in polyvinyl alcohol (PVA), which acting as reducer to gold ion to gold metal and capping agent. The syntheses of the gold nanoparticles were carried with the direct addition of the aqueous $HAuCl_4$ solution to aqueous PVA solution at 50 °C. Initially, the PVA solution was prepared by using 2 g of PVA per 100 ml of distilled water in a round bottom flask which was placed in oil bath placed over the magnetic stirrer. Subsequently, the aqueous solution $HAuCl_4$ was added drop-wise to the PVA solution. Afterward, the solution was made viscous by heating at same temperature and casted in form of nanocomposites films. Various compositions of $HAuCl_4$ (0.2 wt%, 0.5 wt%, 1.0 wt% and 1.5 wt%) with respect to PVA (films of Au-PVA nanocomposites) were prepared. Upon drying in ambient condition these films were analyzed with XRD, SEM, EDX, TGA, UV–Visible, and IR techniques. The XRD analysis reveals the fcc crystal structure with crystallite size nearly 22 nm. The crystallite size is in agreement with that obtained by SEM analysis which is in range of 25–30 nm and particles are nearly spherical in shape. Furthermore, the UV–visible analysis showed the surface plasmon resonance (SPR) band at ~ 550 nm which confirmed the formation of gold nanoparticles. It is further supported by the EDX analysis that showed the gold peaks in the spectrum.

1. Introduction:

Noble metal nanoparticles had an increased attention over the last decade and still fascinating the researcher to greater extent due to their unique photochemical properties [1–7]. In particular the gold nanoparticles have been unique characteristics such as tunable localized surface plasmon resonance enable them wide variety of application such as Förster resonance energy (FRET) sensor, photo-thermal therapy (PTT), catalysis, electronics, and energy storage devices [5–9]. For instance, spherical gold nanoparticles have extensively used in the FRET process because of no dipole moment it can interact with the donor from all faces in the visible region [9]. On the other hand the gold nanorods had been used as the sensor over wide range from visible to near infrared region due to their tunable wavelength spectrum. Moreover, the PTT application of gold nanoparticles is due to the exceptionally high absorption cross-section through surface plasmon resonance (SPR) compared to the bulk gold that result in increase the localized temperature which is essential principle of the cancer treatment process [10]. All these properties are dependent on the size and shape of the nanoparticles, therefore, to control the size and the shape of the gold nanoparticles many methods have been used [11]. For instance, the chemical reduction method in which the gold ions are reduces to gold atoms with the application of suitable reducing agent. Commonly, used reducing agents are $NaBH_4$, hydrazine, and gaseous hydrogen [11–15]. Moreover, green synthesis process has also been developed in which the nature of the reducing agent was mild and the sources of the reducing agents were green plants [16]. Additionally, in a polyol process the reduction of the metal ions to metal were achieved by using the different molecules containing the OH functional group such as ethylene

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BMC Chemistry

RESEARCH ARTICLE Open Access

Synthesis, biological evaluation and docking studies of 1,2,4-oxadiazole linked 5-fluorouracil derivatives as anticancer agents

Ravi Kumar Bommera[1], Shashikala Kethireddy[2], Rajeshwar Reddy Govindapur[3] and Laxminarayana Eppakayala[1*]

Abstract

Background: 1,2,4-oxadiazole derivatives exhibited significant anti-cancer activity when they were evaluated, against human cancer cell lines. They also showed anti-inflammatory, analgesic, diabetic, immunosuppressive, α,β_3-receptor antagonist, antimicrobial, anti-helminthic, histamine-H3 and antiparasitic properties. A pyrimidine analog, 5 fluoro-uracil is a chemotherapeutic drug used for treating multiple solid malignant tumors. But its application is limited, as it has side effects like low bioavailability and high toxicity. Molecular docking is an exemplary tool, helps in identifying target and designing a drug containing high bio-availability and minimum toxicity.

Results: A set of 1,2,4-oxadiazole linked 5-fluoruracil derivatives (7a–j) were synthesized and their structures were confirmed by ^{1}HNMR, ^{13}CNMR and Mass spectral analysis. Further, these compounds were investigated for their anti-cancer activity towards a panel of four human cancer cell lines such as (MCF-7, MDA MB-231), lung cancer (A549) and prostate cancer (DU-145) by using MTT method. Among them, compounds 7a, 7b, 7c, 7d and 7i demonstrated more promising anticancer activity than standard.

Conclusion: Synthesized derivatives (7a–j) of 1,2,4-oxadiazole linked 5-fluorouracil and investigated for their anticancer activity towards a panel of four human cancer cell lines.

Keywords: 5-Fluorouracil, Ataluren, Pyrimidine, Oxadiazole and anticancer activity

Background

Over the past few decades, heterocyclic rings containing nitrogen atoms have played a significant role in medicinal chemistry. They are considered as key templates for the development of new therapeutic agents [1]. Among all the nitrogenated compounds, pyrimidines are a more privileged class of six-membered heterocyclic organic units. They occupy a unique position in medicinal chemistry due to their wide range of biological applications [2–12]. Pyrimidines exist as an essential component in several nucleic acids and therapeutic drugs, such as 5-Fluorouracil (**1**, 5-FU, Fig. 1) [13–16]. The USFDA-approved drug, 5-FU, is one of the most distinguishable chemotherapeutic drugs available. It was first synthesized by Heidelberger and co-workers [17]. It shows antitumor activity by inhibition of thymidylate synthetase enzyme leading to prevention of DNA synthesis [18], and has been used frequently for the treatment of various solid malignant tumors [19–21]. However, it has limited clinical applications because of several side effects, including poor tumor selectivity, toxicity, lower drug-resistance, gastrointestinal toxicity, and adverse effects on central nervous system [22, 23]. Previously, many researchers have developed several 5-FU contained compounds to overcome

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The pK_a of Pentazole (HN_5)

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Pentazole having the molecular formula HN_5 is an archetypical five-membered homocyclic inorganic aromatic molecule consisting of five nitrogen atoms. A hydrogen atom is bonded to one of the nitrogens. Even though the molecule does not contain a carbon it appears last in the series of the heterocyclic azole family; the family containing one to five nitrogen atoms. This series of heterocyclic azoles is pyrrole, imidazole, pyrazole, triazole, tetrazole, and the last one is the pentazole. Barring pentazole, the rest of the members of the azole family are heterocyclic organic molecules. The pK_a of N(1)H-acidity values of all the azole members are known, except for that of pentazole. In the present work we endeavoured to determine the pK_a of pentazole by a graphical method and by performing theoretical DFT calculations.

Keywords: pentazole, pK_a, DFT.

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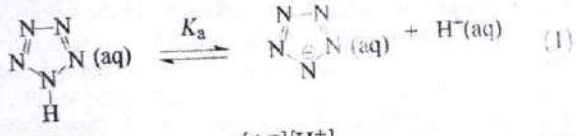
Introduction

The chemistry of pentazole has a long debatable history.[1–11] A century ago, the preparation of its silver salt AgN_5 was reported by Lipschitz[1] and later it was refuted by Curtius et al.[2] Though the X-ray crystal structure of a related compound, 4-dimethylaminophenylpentazole was reported,[3] the synthesis of pentazole HN_5 was not.[4] Subsequently, several papers appeared in the literature regarding pentazole and its substituted compounds reporting on their various aspects like their stability and its existence.[5–11] The pK_a of pentazole has not been reported either by experiment, owing to its instability, or by theory in any of the earlier research articles. The only small report that appeared regarding the pK_a was by Katritzky et al.[12] Owing to the difficulty in the synthesis of pentazole (if at all synthesised it is in a metastable state), the experimental pK_a has not been reported so far. This was the motivation to carry out theoretical studies. The theoretical study reported here sheds light on the fact that the pK_a determined by extrapolation method might not be correct. Further it is proposed that the pK_a values determined by SMD_{SSAS} (a solvation model based on a density–scaled solvent-accessible surface model) appear to be correct.

It is known that pK_a is the negative logarithm of K_a, the equilibrium constant of the acid dissociation reaction $HA \rightleftharpoons A^- + H^+$ in aqueous solution. In any graduate laboratory, experimental methods, like potentiometry, conductometry, and UV-visible spectroscopy, are available to determine the equilibrium constant K_a. The acid dissociation constant K_a is the quantitative measure of the strength of an acid in solution; yet the symbol pK_a, which is the negative logarithm of K_a, is more commonly used. At equilibrium, in the acid dissociation reaction $HA \rightleftharpoons A^- + H^+$ the concentrations of HA, A^-, and H^+ will not change with the passage of time because the rates of the forward and backward reactions are equal.[13] The acid dissociation reaction $HA \rightleftharpoons A^- + H^+$ for pentazole is shown in Eqn 1, the equation for K_a is given in Eqn 2, and the subsequent equation for pK_a is given in Eqn 3.



(1)

$$K_a = \frac{[A^-][H^+]}{[HA]} \quad (2)$$

$$pK_a = -\log_{10} K_a = \log_{10} \frac{[HA]}{[A^-][H^+]} \quad (3)$$

Methods

All the linear correlations were done using the *KaleidaGraph* software (Reading, PA, USA). The chemical structures were drawn using *Chemdraw*. *Gaussian 09* software was utilised for theoretical calculations.[14] Density functional theory (DFT) was used to calculate the pK_a values. The reactant and the products were optimized and frequency calculations were performed using the wB97XD[15] and B3LYP functional with 6-311+g(d,p) basis set. pK_a values were determined using the SMD continuum model. The pK_a values were determined by both default SMD (solvation model based on density) and SMD_{SSAS} (scaled solvent-accessible surface). Here the

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VARIOUS TECHNOLOGICAL PROCESSES

Enhanced Optical and Electrical Properties of Graphene Oxide-Silver Nanoparticles Nanocomposite Film by Thermal Annealing in the Air

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Abstract—Here, we report the enhanced optical and electrical properties of graphene oxide-silver nanoparticles (GO-AgNPs) nanocomposite due to thermal annealing in air at different temperatures (150, 250, and 350°C). Our findings show that the optical properties of the GO-AgNPs film strongly depend on the annealing temperature. With an increase in annealing temperature, the optical absorption band and photoluminescence (PL) band are monotonically shifted towards a longer wavelength with a slight increase in absorbance. Interestingly, annealing of the nanocomposite film at 350°C in the air results in the nitrogen-doping from air into GO lattice. Unlike the PL bands in the near-ultraviolet (UV) range in cases of GO-AgNPs annealed at 150 and 250°C, this film exhibits pronounced multiple PL bands in the visible range, which are attributed to optical transitions associated with the localized nitrogen defects incorporated from air under thermal annealing and charge transfer between AgNPs and carbon. Mechanisms of the observed optical properties are also discussed. Furthermore, thermal annealing of the film also affects its electrical properties. The sheet resistance of the film reduces with the increase of annealing temperature and its lowest value ~ 21 Ω/□ with transmittance ~ 82% at 550 nm is achieved at 350°C.

Keywords: Thermal annealing in air, nitrogen-doped graphene oxide-silver nanoparticles, transparent conductive electrode, photoluminescence

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INTRODUCTION

Graphene has been recognized as a promising material that could be utilized in many areas that include electronics, optoelectronics, energy, and biochemistry [1–10]. However, experimentally synthesized pure graphene has some limitations such as lack of band gap in sp^2 hybridized structure, high sheet resistance [1], and less pronounced luminescence [11]. Modification of graphene structure is therefore needed to extend its effective utilization in various application sectors. Chemically synthesized graphene oxide (GO), in this scenario, has been an attractive and basic material. GO consists of sp^2 bonded carbon atoms with a large fraction of sp^3 hybridized carbon atoms bound to oxygen-related functional groups. GO is an insulator and reduction of GO is demanded to make it conductor or semiconductor which are key materials used in electronic and optoelectronic devices. The reduction of GO indicates the increase of sp^2 contents and materials tend to transform from insulating GO to conducting graphene structure [12]. Ag nanoparticles (AgNPs) have been widely used to fab-

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Research Article

Molecular docking studies of *Chenopodium album* Linn with Lanosterol synthase enzyme

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Abstract
Cardiovascular diseases (CVD) are the major cause of death among people across the globe. Hypercholesterolemia is one of the major contributing factors for CVD. Molecules that bind with Lanosterol synthase enzyme, can be potential drug targets. Statin group of compounds like Simvastatin, cerivastatin, Atorvastatin etc., used for treating hypercholesterolemia have side effects and hence there is a growing demand for plant derived flavonoids. This work focusses on studying the compounds quercetin-3-*O*-(2",6"-di-*O*-α-L-rhamnopyranosyl)-β-D-glucopyranoside, kaempferol-3-*O*-(2",6"-di-*O*-α-L-rhamnopyranosyl)-β-D-glucopyranoside, rutin; quercetin-3-*O*-β-D-glucopyranoside (Iso quercetin); and kaempferol-3-*O*-β-D-glucopyranoside (Astragalin) present in *Chenopodium album* Linn to inhibit Lanosterol synthase. Bioactivity score, drug likeness character was assessed *in silico*. Based on bioactivity spectrum, it is observed that the molecules are biologically active and the probability of these compounds to be biologically active is ranging from 0.784 to 0.992, suggesting that these compounds are effective for treating hypercholesterolemia. In the molecular docking studies, the compounds binding affinity score was in agreement that the molecules have the potential to be used as an alternative to the statin group of compounds in treating cholesterol.

Keywords: Bioactivity, *Chenopodium album*, Hypercholesterolemia, *Lanosterol synthase* enzyme, Molecular docking

INTRODUCTION

Ethnomedicinal plants remain largely unexplored and there is a good scope for researchers and food processors to bring out these economical, easily grown plants to the mainstream food basket (Pala *et al.*, 2019., Salmerón-ManzanoEsther *et al.*, 2020). *Chenopodium album* Linn, is one such plant with good nutritive value (fibre, fatty acids and minerals). In India, it is called as Bathua and it belongs to Amaranthaceae family and Chenopodium genus (Bajwa Ali *et al.*, 2019). *C. Album* is rich in flavonoids that play an important role in its pharmacological and therapeutic properties.

Flavonoids are phenolic compounds possessing a wide spectrum of biological activities and are studied for anti-cancer and reducing the risk of cardiovascular diseases caused by oxidative stress (AlexanderVictor *et al.*, 2016, Thilakavathy Thangasamy *et al.*, 2009). *C.Album* has been found to possess the bioflavonoids, Quercetin and Kaempferol derivatives (Gohar and Elmazar 1997, Cutillo *et al.*, 2006, Laghari *et al.*,2011) Hypercholesterolemia is considered as one of the factors for coronary heart diseases. Chemically synthesised drugs used to treat hypercholesterolemia contain statin group that on prolonged use causes muscle weakness, memory loss and inhibits coenzyme Q10 important for electron transfer in mitochondria (Wagstaff *et al.*, 2003, Jamolowicz Al *et al.*, 2015). In this context, it is highly relevant to focus on plant derived flavonoids that are effective in treating hypercholesterolemia.

Lanosterol synthase, also known as lanosterol cyclase, is a microsomal enzyme and a target for drugs lowering cholesterol (Telford *et al.*, 2005, Vanessa *et al.*, 2018). The potential anti-cholesteremic drug binds to the active sites of the Lanosterol synthase enzyme and inhibits it. To establish a plant derived flavonoid as a potential bioactive compound, it is important that we screen it theoretically and know its pharmacological and binding properties.

In the present work, we carried out *in-silico* calculation

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Effect of $BaTiO_3$ phase on frequency dispersion characteristics of $Mg_{0.48}Cu_{0.12}Zn_{0.4}Fe_2O_4$ + $BaTiO_3$ nanocomposites

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ABSTRACT

Multiferroic nanocomposites of ferrite and ferroelectric phases with systematically varying composition (100-x) $Mg_{0.48}Cu_{0.12}Zn_{0.4}Fe_2O_4$ + x$BaTiO_3$ (MCZBT) (where, x = 0, 20, 40, 50, 60, 80, 100 mol%) were prepared for the first time by mechanical milling and sintering method. The presence of ferrite and ferroelectric phases in nanocomposite samples were confirmed by X-ray diffraction (XRD) while microstructural characterization was carried out by scanning electron microscopy (SEM). The average grain size, from SEM, was found to be in the range 80 nm for ferrite and 86 nm for $BaTiO_3$ nanopowders. The complex permittivity and the complex permeability variations as a function of frequency in the range 100 kHz – 1.8 GHz, were investigated using LCR meter and Impedance analyzer. The resonance and relaxation phenomena were observed by all the samples around 1.18 GHz from the permittivity studies. From the studies of microwave absorbing properties in X-band (8–12 GHz) frequency region, it was found that the minimum reflection loss of −24.61 dB with bandwidth of 3.38 GHz was obtained by sample with 20% ferroelectric phase. The studies on reflection loss and transmission loss indicated that the effective absorption of incident microwave was found to be above 80% and the composite sample with 80% of ferroelectric phase absorbed more than 91% of the incident wave. The results suggested that the present sample materials can be used for making microwave shielding devises for EMI applications.

1. Introduction

Multiferroic composite materials that display coexistence of ferroelectric and ferromagnetic responses attracted the current interest due to their magnetic and dielectric properties that are appropriate for several novel device applications such as high frequency Multi Layer Chip Inductor (MLCI) applications, electromagnetic interference (EMI) filters and sensors etc [1,2]. Dielectric and magnetic property studies and their dependence on composition and structure of nanocomposites lay the foundation for developing the new materials with predetermined properties since the interrelationship of properties of filler and matrix phases of composites help in the design of devices for applications. The frequency dispersion characteristics of ferrite and ferroelectric composites are deciding parameters while using these materials as microwave absorbers and EMI shielding materials in various applications [3,4]. The advanced technological developments in the field of telecommunications and several industrial sectors demand not only effective EMI shields but also materials that satisfy certain requirements for each engineered design such as light weight, corrosion resistant, flexibility, processing easiness, tunable morphology, and inexpensiveness [5]. Another priority is developing radar absorbing materials for military stealth applications in X-band (8–12 GHz) frequency region. A significant research has been done over recent years on microwave absorption performance of various nanomaterials [6,7]. However, these absorbing materials cannot satisfy all requirements simultaneously, such as absorption, wide bandwidth, light weight, etc. [8].

In the current work ferrite ferroelectric nanocomposites are selected to synthesize and study properties, the reason being due to the fact that spinel ferrites and perovskite ferroelectrics show good phase compatibility through magnetoelectric coupling and the interconnectivity of the phases can be controlled by their relative amount and processing methods. Moreover, there exists good lattice match between perovoskite ferroelectric, $BaTiO_3$ (lattice constant, a ≈ 4.03 Å) and spinel ferrite (lattice constant, a ≈ 8.33 Å), with ferrite lattice constant close to twice the perovskite lattice constant, which is expected to have excellent wetting between two phases resulting in strong interface adhesion in composites [9]. Due to their excellent dielectric and magnetic

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IMPACT OF THERMAL RADIATION AND CHEMICAL REACTION ON MHD HEAT AND MASS TRANSFER CASSON NANOFLUID FLOW PAST A STRETCHING SHEET IN PRESENCE OF HEAT SOURCE/SINK

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ABSTRACT

The purpose of present study is to analyse the influence of chemical reaction on MHD Casson nanofluid flow on an elongating sheet taken into the account of radiation and heat absorption/generation. The governing nonlinear PDE's are changed into a nonlinear ODE's by using similarity transformations. The converted equations are solved using numerical technique is notable as Keller box method. The consequence of heat source/sink, Prandtl number, Casson parameter, magnetic field, Brownian motion, thermophoresis, thermal radiation and chemical reaction parameters on velocity, temperature, and concentration profiles are depicted and elucidate in physical terms. A resemblance with previously issued results shown a perfect agreement. Numerical values of physical quantities, such as velocity gradient, heat transfer rate and the mass transfer rate are arranged in tabular form.

Keywords: thermal radiation, heat source/ sink, stretching sheet, casson nanofluid, MHD, chemical reaction.

INTRODUCTION

The study of nanofluids have fascinated because of its remarkable applications in industry such as solar cells, electronics, solar stills, communication, solar cooling systems, computing technologies, solar collectors, optical devices, water heaters, lasers, absorption refrigeration systems, and medicine, synthesis of various solar devices because of their higher properties over the conventional fluids. A nanofluid, consisting of a base fluid and nanoparticles, is a modern division of heat transfer fluids. The utilization of supplement is an approach to intensify the performance of heat transfer in base fluids. The heat conductance of conventional heat transfer fluids does not encounter the demands of modern cooling rate. Nanofluids are suspensions of ultrafine-grained solid particles (nanoparticles) and it improves the convective heat transfer and heat conductivity in common fluids. Choi and Eastman [1] analysed the increased thermal conductivity of nanoparticle fluids. S. K. Das *et al.* [2] investigated the Heat Transfer in Nanofluids. Natural convective heat and mass transfer nanofluid boundary layer flow through a vertical plate with convective boundary condition was studied by Aziz and W.A. Khan [3]. D. Srinivasacharya and Ontela Surender [4] examined the non-similar solution by considering double stratification on natural convection heat transfer of a nanofluid in a porous saturated medium over a vertical plate. Elsheikh *et al.* [5] studied the various applications in solar energy with nanofluids.

Magnetohydrodynamic (MHD) nanofluids perform an important part in several manufacturing procedures such as in hybrid fuel generation, modulator, economy fuel in modern power generation plants, gratings, coolant in continuous metallurgical sheets, fiber filters, vehicle cooling, loud speakers, plastic sheet extrusion and processes of polymers, and magnetic cells, etc. Rizwan Ul Haq *et al.* [6] analysed the magneto-hydrodynamic stagnation point Nanofluid flow in presence of radiation on a stretching sheet with slip conditions. A.S. Dogonchi *et al.* [7] discussed heat transfer and thermal radiation MHD nanofluid flow between parallel plates. A. Kamran *et al.* [8] observed Magneto-hydrodynamic Casson Nanofluid with velocity slip and Joule heating. Jawad Raza *et al.*, [9] investigated MHD heat and mass transfer Nanofluid flow past a nonlinear permeable stretching sheet with multiple slips. Saeed Islam *et al.* [10] examined the influence of thermal radiation and hall current between two surfaces on MHD micropolar non-Newtonian hybrid Nanofluid flow.

Thermal radiation plays an important role in dissipating heat from the surface. It has applications in manufacturing industries such as chopper, space vehicles, reliable equipment design, satellites, atomic furnaces, missiles, space technology and procedures related to high temperature. Yanala Dharmendar Reddy *et al.*, [11] analyzed thermal radiation and suction effects on MHD Nanofluid boundary layer flow on a non-linear stretching sheet. Kothandapani and J. Prakash [12] observed peristaltic transport in a tapered asymmetric channel of a Williamson Nanofluid in the presence of thermal radiation. C.Sulochana *et al.* [13] analysed effects of soret and suction/blowing on MHD stagnation point flow of a radiative Carreau nanofluid on a stretching surface. Yap Bing Kho *et al.*, [14] investigated impact of radiation on MHD heat and mass transfer Casson Nanofluid flow on a porous stretching sheet. Jawad Raza [15] discussed impact of radiation and velocity slip on magnetohydrodynamic stagnation point flow of Casson fluid with convective boundary conditions through a linear elongated sheet.

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Molecular interaction studies of hydrogen-bonded N-Methyl-2-Pyrrolidone /Ethanol binary mixtures by dielectric relaxation spectroscopy and their temperature dependence

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ABSTRACT

Complex permittivity of the binary mixtures of N-Methyl-2-Pyrrolidone (NMP) with Ethanol (ETH) has been studied in the microwave frequency range at various temperatures. The binary liquid system NMP-ETH is selected to interpret the effect of carbonyl (-C═O) group of NMP and hydroxyl group (-OH) of ETH on the volumetric, thermal and dielectric properties. The dipole moment (μ) and relaxation time (τ) is evaluated from Higasi's method and Havriliak-Negami equation. The excess molar volume (V_m^E), excess permittivity (ε^E), excess refractive index (n_D^E), excess inverse relaxation time $(1/\tau)^E$ are fitted with the Redlich-Kister equation. The results obtained from Polarizable Continuum Model (PCM) and Integral Equation Formalism Polarizable Continuum Model (IEFPCM) solvation theories using DFT methods are correlated with the experimentally determined parameters. The molecular association and chemical stability of the system is interpreted in terms of single-point energy, HOMO-LUMO calculations. The existence of a hydrogen bond within the NMP-ETH system is confirmed from the FT-IR, UV–Vis's spectra.

1. Introduction

Dielectric Relaxation Spectroscopy (DRS) is one of the prominent methods to explore the molecular structure in the liquid systems by determining the relaxation dynamics of the molecules, dipole moment, and interfacial polarization properties [1–8]. The investigation of molecular interactions in the liquid binary systems is one of the challenging tasks and their change in properties with respective frequency and temperature is very much useful in practical engineering and technological applications [9–15]. The investigation of dielectric relaxation properties of the different solute and solvent systems in the broader frequency range (10 μHz- 300 GHz) describes the strength of the molecular interaction, the existence of multimers in the mixtures, the alignment of the dipoles, and their conduction mechanism. The theoretical and experimental studies on the dielectric studies of complex fluids such as aqueous proteins/tissues in an alcohol medium, liquid mixtures are interdisciplinary and increasing demand in the research field [15–24]. It provides relevant information for the applications of binary liquid mixture systems in the field of pharmaceutical, petrochemical, nuclear, and green industry [25–37].

NMP is an adaptable water-soluble polar aprotic solvent. Due to its multifunctional properties, it is used as a drug solubilizer, penetration enhancer in humans and animals. Also, it is used as a good solvent for many engineering and pharmaceutical utilization by its larger boiling point, lower freezing point, and easy to operate. Ethanol is also one of the good solvents and it has many useful properties that allow it to be used by a range of different industries such as beverage, pharmaceutical, medical, and fuel industry [27–29,38–41]. There are several research papers are available on the frequency-dependent dielectric studies of ethanol with different liquid compounds at various temperatures in the recent past [42–56]. The majority of the dielectric studies on ethanol include calculating the dielectric relaxation time in a different solvent medium at various temperatures and also fluctuations of hydrogen bond networks in the different liquid medium. Further, computational

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Study of Microstructure and Thermal Properties of $PbTiO_3$ Based Glass Ceramics

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Abstract: Glass samples with composition (35- X) B_2O_3 - (40 +X) PbO - 25 TiO_2 (where X= 0, 2.5,5, 7.5 and 10 mol %) were prepared using conventional quenching technique. These glass samples were converted to glass ceramics by following two stage heat treatment schedules. The density (ρ) values of glass ceramic samples are higher than those of corresponding glass samples. It was observed that there was good correlation between the density and Coefficient of Thermal Expansion (CTE) results of the glass–ceramics. The XRD results in the glass ceramics revealed the formation of tetragonal lead titanate ($PbTiO_3$) as a major crystalline phase and lead borate (PbB_2O_4) as minor crystalline phase. The microstructure of glass ceramic samples contains nano crystallites of lead titanate embedded in a borate glass matrix.

INTRODUCTION

$PbTiO_3$ (PT) is a tetragonal perovskite with a c/a ratio of 1.063 at room temperature, which is the largest known for lead-based perovskite compounds. Single crystal data have shown that the large ionic displacements in PT lead to a particularly large spontaneous polarization (>53 μC/cm²) and strain (c/a ratio = 1.06) at room temperature [1]. PT exhibits large pyroelectric coefficients and low relative permittivity (~100-200). However, these excellent properties are not yet fully realised in bulk polycrystalline samples due to difficulty in fabricating undoped PT. $PbTiO_3$ ceramics when prepared by conventional route generally have micro cracks and fracture on cooling below T_c as a result of the large spontaneous strain generated when the structure changes from cubic to tetragonal.

Glass ceramics are the polycrystalline materials prepared by the controlled crystallization of glasses. A wide variety of applications of these versatile materials have been developed as a result of their many outstanding properties and the distinct advantages of the glass ceramic method, in certain circumstances, over conventional ceramic processing routes. Of particular importance in many applications is the high uniformity of the microstructures of glass ceramics, the absence of porosity and the minor changes in volume during the conversion of glass into glass ceramic [2].

Ferroelectric crystalline phases investigated include $SrTiO_3$[3-4], $BaTiO_3$[5-6], $LiTaO_3$[7],$LiNbO_3$[8],$PbTiO_3$[9-11] and (Pb,Sr,Ba)Nb_2O_6[12]. The ferroelectric and dielectric properties of glass-ceramics mainly determined by major crystalline phase and the residual glass or secondary phase(s). However, the excellent adjustability of the composition and microstructure of glass-ceramics promises some advantages of high-permittivity glass-ceramics over the crystalline ferroelectric ceramics (viz. adjustable thermal expansion, dielectric properties, and processing temperature). They also offer the benefit of process compatibility with ceramic substrates and metallized components. Therefore, high-permittivity glass ceramic materials are candidates for capacitors, hybrid circuits, electro-optic, and cryogenic applications [13-14].

In this paper microstructure and thermal properties of $PbTiO_3$ based Glass Ceramics of (35- X) B_2O_3 - (40 +X) PbO - 25 TiO_2 has been reported.

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Quenching Effect of co-dopant Pr^{3+} on Red Emitting Yttrium Vanadate Phosphor Doped with Eu(III)

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Abstract: $Y_{1-x}VO_4$: Eu_{x-y}^{3+}: Pr_y^{3+} with x = 6 mole % and y = 0, 2, 3 ,4, 5, 6, mole % phosphors have been prepared by solid state reaction. The dopant Eu^{3+} concentration was optimized along with the co-dopant Pr^{3+} concentration in the yttrium vanadate host lattice with the help of photoluminescence (PL) spectra. The phosphors have displayed red color under UV source. Pr^{3+} acts as quencher and quenching effect of co-dopant Pr^{3+} on Red Emitting Yttrium Vanadate Phosphor Doped with Eu(III) using luminescence Studies on $Y_{1-x}VO_4$: Eu_{x-y}^{3+} : Pr_y^{3+} systems are presented in detail in this paper. The emission intensities were determined and the relative fluorescence intensities have been estimated. The richness of the red color is verified by determining the chromaticity coordinates (X, Y) from the CIE standard charts.

INTRODUCTION

The crystal field of the monazite characteristics makes YVO_4 a very attractive laser material with dopants Eu^{3+}, Tm^{3+}, Tb^{3+}, Er^{3+}, Ho^{3+}, Ce^{3+} and Pr^{3+} [1-14]. Of these Red Emitting Yttrium Vanadate Phosphor doped with Eu(III) is found to be very attractive potential laser material. . YVO_4 is an important host lattice for phosphors [5-6] due to its application in TV screens and high pressure mercury vapor (hpmc) lamps. Among the rare earth ions, praseodymium (Pr^{3+}) has drawn the attention of several researchers due to the capability of emitting efficiently [15]. Examples Pr^{3+} as a sensitizer, which enhances the excitation resulting in transfer of energy to dopants through a non-radiative process and Pr^{3+} as quencher which quenches emission of energy of dopants through non-radiative relaxation of the system are available in literature i.e. in some hosts it demonstrates energy transfer between Pr^{3+} and dopants [16–24] while in some other hosts it demonstrates a lack of energy transfer between it and dopants [25,26]. Photo luminescent (PL) properties of Pr^{3+} co-doped phosphors especially in crystalline hosts have been reported by many researchers [16–29].

The YVO_4 crystal is tetragonal, belonging to space group D_{4h}. The dopant rare earth ion substitutes on Y^{3+} ion sites the local site symmetry will be D_{2d} and it is surrounded by eight O^{2-} ions [30,31]. The information on the red luminescence under ultraviolet excitation of rare earth vanadate was first reported by Van Uitert et al [32]. Europium doping gives red emission in YVO_4 with four main groups of emission lines of peaks at 700nm, 655nm, 621nm and 595nm and has been assigned to $^5D_0 \rightarrow {}^7F_4$, $^5D_0 \rightarrow {}^7F_3$, $^5D_0 \rightarrow {}^7F_2$ and $^5D_0 \rightarrow {}^7F_1$ transitions respectively, for Eu^{3+} ion. The luminescent properties and the crystallographic data on all rare earth vanadates are available in literature [30,31]. The development by Levine and Palila [33,] of europium activated yttrium orthovanadate as a highly efficient red emitting cathodoluminescent phosphor and its adoption for color television aroused interest in other lanthanide activated orthovanadates. Bixner et al [34] investigated $Ca_3(VO_4)^2$ and found it to be moderately efficient as a host of Eu, but simultaneously inferior to YVO_4. The systems more efficient than $Ca_3(VO_4)^2$ based on were described by Palila et al. [33], who showed that the exciting energies are absorbed by the VO_4^{3-} ions and is transferred to activators.

In the present work an attempt has been made to vary the concentration of Pr^{3+} and study the efficiency of red emitting YVO4: Eu^{3+}: Pr^{3+} phosphor. Initially, Eu^{3+} concentration in the lattice was optimized at 6 mole % with the help of PL studies and this composition has been taken further to study the effect of Pr^{3+} as co dopant. . Prepared powder phosphors were characterized by XRD and PL spectra. The results are reported and discussed in this article.

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Enhanced electrical properties of $Sr(Bi_{3.9}La_{0.1})(Ti_{3.975}Zr_{0.025})O_{15}$ ceramic with the doping of Nd

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WEB 2.0 TOOLS: USE OF KAHOOT TO REDUCE THE SPELLING MISTAKES AMONG B.TECH LEARNERS OF COMMUNICATIVE ENGLISH

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Cite This Article: G. Latha Suhasini & Dr. Diksha Dhar, "Web 2.0 Tools: Use of Kahoot to Reduce the Spelling Mistakes among B.Tech Learners of Communicative English", International Journal of Interdisciplinary Research in Arts and Humanities, Volume 5, Issue 2, Page Number 1-3, 2020.

Abstract:

BTech learners of Communicative English are inclined towards technology and hardly focus on spellings in their writing. Today, students are called as netizens or net generations (Educause.edu, 2016) due to their over usage of web tools. My paper explores strategies to reduce spelling mistakes in BTech learners of Communicative English by introducing games using Kahoot, in the class. In the empirical design approach, the questions framed by the teacher would help the learner identify the correct spelling through game based learning. Though the learners face technical challenges, learning through games is very interesting.

Key Words: Net Generation, Kahoot, Undergraduates of Engineering , Spellings

Hypothesis:

The Engineering undergraduates who are interested in anything with internet would learn correct spelling through game based e-learning.

Introduction:

Most of the teachers find it challenging to teach spellings to students at undergraduate level. Due to heterogeneous educational background, many students are unable to spell the words right in their academic writing. This has affected their career growth. As technical students are inclined towards technology, teaching-learning process using web 2.0 tools becomes more compatible. Introducing Quizzes through Kahoot which is a game based LMS motivates and engages students and a positive impact develops in the learning process in them.

Rabail Tahir in his research investigated the effect of using Kahoot in his classroom.He focused on learning performance, classroom dynamics, students' and teachers' attitudes and perceptions, and student anxiety. Through his qualitative and quantitative research with 93 students, he found Kahoot to have a positive effect in teaching and learning process. He felt technical hitches, time stress and fear of losing the game were the challenges the students faced.

The method is to design a game based questionnaire where students would respond using the Kahoot! Kahoot! is a game-based student response system (GSRS) where the classroom is temporarily transformed into a game show where the teacher is the game show host, and the students are the contenders (Wang, 2015)[1].The teacher frames some quiz questions and creates the game using Kahoot! The students would respond to them. Some conceptual questions that would test their retention and spelling ability will be asked in the game as a quiz. The students have an option to redo their wrong questions. In this process the students identify their mistakes and learn the correct spelling. Kahoot! The game-based application is very interesting and easy to create and motivating to play games in the classroom. Multiple choice questions or true or false type questions can be asked using Kahoot. The background music while playing the game not only triggers enthusiasm in students but also keeps them alert throughout the game.This enhances students' concentration and keeps them focused on what they are supposed to do. Above all, playing games break the monotony of the traditional classroom and makes a learner centred class.The results would be based on score of every individual. It would be number of questions answered correctly in the given time. Based on the score the ability of the student would be analysed and the teacher would plan further quizzes based on the responses.

Samples/Population:

40 students of III year Mechanical Engineering of whom only 19 could participate.

Method:

To test the spellings, I have framed 10 questions on the topic Presentation skills. The questions were to review the lesson and also to test the spelling ability in the learner. Four options were given to answer each question. Three of the four options had wrong spelling that would sound similar. The learner needs to comprehend the question, recollect the answer and identify the answer with its correct spelling. Of 40 students in the class only 19 could participate as few did not have an extra device to play, few had problem with the connectivity and few others had no technical knowledge. Of 19 participants only 17 were able to answer as the other two could not match the speed of the game as the game has fixed time to answer each question. This gave

Química

A simple rule of thumb for the explanation of d-orbital splitting in complexes

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Abstract

In chemistry at pre-university level and freshman engineering (non-chemistry discipline) classrooms at universities in India, the splitting of the energy levels of d-orbitals in complexes is an important concept to be learnt, but is not explicitly explained in the standard books used. In the standard books such as 'Concise Inorganic Chemistry' by J .D .Lee and 'Theoretical Inorganic Chemistry' by Marion Clyde Jr. Day and Joel Selbin, they have explained the splitting of d–orbitals in octahedral, tetrahedral, square planar etc., complexes very well. The same is the case with the latest pre-university NCERT chemistry textbook (Volume I) written for the Indian audience. The reason why the energy levels of certain d-orbitals are above the barycenter and why some are below the barycenter, however, is not explained explicitly in any of the books (including the latest books). This short communication outlines a simple rule of thumb that allows this phenomenon to be explained to students. Further, an important graph in the standard books is plotted, but the trend of the curve is not explained. This simple rule is also helpful in explaining this graph and the chemical phenomenon represented.

Keywords

D-orbitals, lowering of energy, gain of energy, attraction, repulsion.

Una simple regla para la explicación de la división del orbital d en complejos

Resumen

En las aulas de química a nivel preuniversitario y de ingeniería (disciplina no química) de primer año en universidades de la India, la división de los niveles de energía de los orbitales d en complejos es un concepto importante que debe aprenderse, pero no se explica explícitamente en los libros estándar usados. En los libros estándar como 'Química inorgánica concisa' de J .D. Lee y 'Química inorgánica teórica' de Marion Clyde Jr. Day y Joel Selbin, han explicado la división de los orbitales d en octaédricos, tetraédricos, planos cuadrados, etc. ., complejos muy bien. Lo mismo ocurre con el último libro de texto de química preuniversitario NCERT (Volumen I) escrito para la audiencia india. La razón por la que los niveles de energía de ciertos orbitales d están por encima del baricentro y por qué algunos están por debajo del baricentro, sin embargo, no se explica en ninguno de los libros (incluidos los últimos libros). Esta breve comunicación describe una simple regla empírica que permite explicar este fenómeno a los estudiantes. Además, se traza un gráfico importante en los libros estándar, pero no se explica la tendencia de la curva. Esta sencilla regla también es útil para explicar este gráfico y el fenómeno químico representado.

Palabras clave

D-orbitales, disminución de energía, ganancia de energía, atracción, repulsión.

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Structural and microwave behavior of Dy^{3+}-substituted $Ni_{0.5}Zn_{0.5}Dy_xFe_{2-x}O_4$ ferrites

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ABSTRACT

The enhancement of microwave absorbing properties in dysprosium ion (Dy^{3+})-substituted nickel–zinc ferrites ($Ni_{0.5}Zn_{0.5}Dy_xFe_{2-x}O_4$; x = 0.00, 0.01, 0.03, 0.05, 0.07 and 0.09) has been investigated in this work. The ferrite powders were synthesized by microwave-hydrothermal method and then powders were densified at 900 °C for 40 min using microwave furnace. The samples' structural and morphological properties were studied using X-ray diffraction and scanning electron microscopy (SEM), respectively. The structural result confirms the spinel phase under low Dy^{3+} content, like the pure Ni–Zn ferrite, while a secondary phase of $DyFeO_3$ appears after the content of Dy^{3+} exceeds a certain limit ($x > 0.07$). Morphological analysis from the SEM images reveals the formation of spherical grains of the samples. DC resistivity of the samples has been measured using two-probe method. Magnetic hysteresis data confirm the soft magnetic nature of the samples. The vector network analyzer results show that adjusting the content of Dy^{3+} is significant in changing the magneto-dielectric properties and microwave absorption capacity of the materials. The composition x = 0.07 sample showed a reflection coefficient of − 33.24 dB at the frequency and bandwidth of 10.31 GHz and 2.59 GHz for an absorber thickness of 2.5 mm for losses less than − 10 dB. This acquired result indicates that the investigated samples could be used as a microwave absorber application in X-band.

1 Introduction

Spinel ferrites are the most attractive magnetic oxides due to their diversified fundamental and technical applications [1–3]. The general formula of the spinel ferrites is MFe_2O_4, where M represents the divalent metal cation like Ni, Co, Zn, Mg and Mn. The unit cell of these ferrites has a cubic symmetry and contains eight formula units of MFe_2O_4. The relatively large-sized oxygen ions form a face-centered cubic structure and each cubic unit cell consists of '64' tetrahedral (A) sites and '32' octahedral (B) sites; out of these

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Influence of hydrogen bond networks in Glycerol / N-Methyl-2-Pyrrolidone mixtures studied by dielectric relaxation spectroscopy

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ABSTRACT

In this paper, we report the dielectric permittivity of the Glycerol (Gly) with N-Methyl-2-Pyrrolidone (NMP) binary mixtures in the microwave frequency region at different temperatures. The dipole moments of Gly, NMP and their equimolar binary mixtures are calculated by using Higasi's method in the temperature range 298.15K-323.15K. The dielectric relaxation spectra of the binary mixtures are calculated using Cole-Cole and Cole-Davidson equation and shows an unsymmetrical relaxation behaviour. The excess parameters of volume, permittivity, refractive index, polarization and relaxation times are fitted with Redlich-Kister polynomial equation. The molecular association and their hydrogen bond interactions between the components in the mixture are discussed in terms of Kirkwood correlation g^{eff} factor and excess Helmholtz energy (ΔF^E) equation. The mean molecular polarizability (α_M) of the individual and their binary mixture are calculated using Lippincott δ- function potential model and compared with the LeFevre method of polarizability values. The enthalpy of activation ΔH^*, entropy of activation ΔS^* and Gibbs free energy of activation ΔG^* are also evaluated and the results are discussed in terms of the orientation of the dipoles. The presence of hydrogen bonding between Gly and NMP is confirmed from the FT-IR spectra.

1. Introduction

The non-destructive characterization of biological samples/liquids, polymers and gels have stimulated the use of dielectric relaxation spectroscopy (DRS) at a broader frequency range at different temperatures [1]. The DRS is one of the sensitive methods to interpret the structural dynamics, molecular association and orientation of the dipoles in the liquid medium [2]. The dielectric relaxation spectroscopy is well suited for to observe the changes in the electrical properties when liquids mix up at different concentrations and also the hydrated studies of proteins/gels with the change in temperature. Therefore, temperature-dependent dielectric relaxation studies of liquid mixtures are of growing interest [3–9]. The investigation of dielectric permittivity of the mixtures by varying concentration of liquid samples helps to ascertain the structure of the complexes formed in the solution [10–15]. The presence of the hydrogen bond between components present in the mixtures that affect the dielectric permittivity, polarization and its relaxation behaviour properties. The understanding the nature of hydrogen bond remains a complex task due to the type of bonds and components present in the given liquid system [16–22]. The dielectric permittivity studies of hydrogen-bonded polar liquids/polymer nanocomposite materials at broader frequency region are very much interesting and these results are quite useful in the field of biological, medical, and shielding applications [23–32].

Glycerol is a simple polyol compound; due to its antimicrobial and antiviral properties, it is extensively used in wound and burn treatments, effective marker to measure liver diseases, the sweetener in the food industry and as a humectant in pharmaceutical formulations [33–39]. NMP is a good polar solvent with magnificent properties. It is having a wide range of applications due to its higher boiling point, lower freezing point and ease of handling [40,41]. It is used as a solvent for engineering polymers, coating resins, paint stripping, oven cleaners, automotive and industrial cleaner formulations. The dielectric permittivity of the Glyc-

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FeF_3 MEDIATED SYNTHESIS OF 3,4-DIHYDRO-3-PYRIDYL-2*H*-NAPHTHA[2,1-*E*][1,3]OXAZINE DERIVATIVES

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ABSTRACT
Biologically active 3,4-dihydro-3-substituted-2H-naphtho [2,1-e][1,3]oxazine derivatives were synthesized using environmentally benign and economically feasible Lewis acid FeF_3. They are characterized by FT-IR, HNMR and Mass spectroscopic methods.

INTRODUCTION
1,3-oxazine derivatives, especially, when they were condensed with aromatic rings displayeddiverse biological properties, such as antibacterial, anticancer, anti-fungal, analgesic, anticonvulsant and anti-tubercular activities.[i,ii] Moreover, trifluoromethyl-1,3-oxazine-2-one is highly active against various HIV-1 mutant strains, since, they are non-nucleoside reverse transcriptase inhibitors that have an ability to bind and block HIV reverse transcriptase. Further, naphthoxazine derivatives showed high-level potential for the treatment of Parkinson's disease.[iii,iv] They wereshown to be anti-inflammatoryagents. They were also used for treating allergies, ulcers, asthma, diabetes, and arthritis. 1,3-Oxazines have been used as key intermediates in the synthesis of thrombolytic agents, chiral auxiliaries in organic synthesis and liquid crystal devices.[v]In a comprehensive survey of literature, it was found that naphth-1,3-oxazine derivatives were conventionallyprepared using 2-naphthol, and various substituted aryl and heteroaryl aldehydes in the presence of dry methanolic ammonia. Further, the multi-component condensation of phenols or naphthols with primary amines (or ammonia) and two equivalents of aldehydes led to these target molecules. Similarly,condensation of derivatives of Betti base with aromatic aldehydes led to the formation of the corresponding 1,3-oxazine with varied biological properties.[vi] Yet another method involves using the condensation reaction of salicylaldehyde with a primary amine, followed by reduction and then cyclizationreaction with a suitable aldehyde. The oxazines containing six-membered ring nitrogen and oxygen was constructed by a type of Mannich reaction, in which zirconyl(IV)

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Chemical reaction impact on MHD natural convection flow through porous medium past an exponentially stretching sheet in presence of heat source/sink and viscous dissipation

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ABSTRACT

This study investigates the viscous dissipation impact on free convection MHD flow through a porous medium over an exponentially stretching surface in presence of chemical reaction. The basic governing PDEs are converted into non-linear ODE's by using similarity transformations and then using the Keller-box method, numerical solutions are obtained. The flow features of boundary layers along with the bounding surface are identified and analysed using diagrams. It is noted that the increase in the Eckert number, Radiation and Magnetic parameter (M) increases the temperature profiles, while the increase in the chemical reaction parameter, porosity and Schmidt number decreases the concentration profile. To validate the results, a comparative study between the present study and previously published results for a particular case is conducted and good agreement is found between them.

1. Introduction

Engineering and Industrial procedures such as in extrusion processes, the movement of biological fluids, hot rolling, glass-fiber production, the cooling of metallic plates, rubber sheets, the performance of lubricants and paints, wire drawing, melt-spinning, manufacture of plastic, the extrusion of polymers, and aerodynamic plastic sheet extrusion, etc., is needed, has received considerable attention over the last few decades, to research flow on a stretching sheet. Many researchers are researching the movement of fluid over the stretching surface [1–5].

The influence of thermal radiation on convective fluid flows has an abundance of uses in physics and engineering for instance gas-cooled nuclear reactors, gas turbines, propulsion systems, hypersonic flights, space vehicles, solar power engineering, nuclear power plants, and lots of industrial areas, and so on. Several researchers [6–10] are attracted the thermal radiation.

In modern metallurgical and physical procedures, the research of the magnetohydrodynamic (MHD) flow of electrically conductive fluid is actually of great significance as a result of the effect of the magnetic field on the regulation of the boundary layer flow control as well as the effectiveness of numerous systems utilizing electrically conductive fluids. its application in many engineering problems, this kind of flow has attracted the focus of several researchers [11–15] such as plasma studies, geothermal energy extractions, MHD generators, nuclear reactor safety, and furnace structure. Hydromagnetic strategies are employed for the decontamination of

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An efficient synthesis of novel anti influenza viral and cytotoxic derivatives of 4-oxothiazolidin-3-yl)-3-hydroxyquinoxaline-2-carboxamide

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Review

Recent Trends in Noble Metal Nanoparticles for Colorimetric Chemical Sensing and Micro-Electronic Packaging Applications

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Abstract: Noble metal NPs are highly attractive candidates because of their unique combination of physical, chemical, mechanical, and structural properties. A lot of developments in this area are still fascinating the materials research community, and are broadly categorized in various sectors such as chemical sensors, biosensors, Förster resonance energy transfer (FRET), and microelectronic applications. The related function and properties of the noble metals in these areas can be further tailored by tuning their chemical, optical, and electronic properties that are influenced by their size, shape, and distribution. The most widely used Au and Ag NPs in dispersed phase below 100 nm exhibit strong color change in the visible range which alters upon aggregation of the NPs. The chemical sensing of the analyte is influenced by these NPs aggregates. In this article, we have summarized the uniqueness of noble metal NPs, their synthesis methods, nucleation and growth process, and their important applications in chemical sensing, microelectronic packaging, and Förster resonance energy transfer.

Keywords: colloid; nanostructure; microelectronic systems; crystalline; hydrothermal; nucleation and growth

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1. Introduction

Nanomaterial is defined as a material in which the maximum value of one dimension can be 100 nm, which can be further defined as one billionth of meter or 10^{-9} m [1–6]. It is approximately 10 H or 5 Si atoms in a line. It is continuing to be the most rapidly growing R/D sector in last decades, which is evident from more than several billion dollars of annual investment in this particular field [7,8]. Due to its unique features, nanomaterials and NPs allow them to be used for a wide variety of applications in nanotechnology covering medical science, chemical, bio-network, applied physics, materials, microelectronic and metallurgy science, and engineering. There are lots of investments in the area of medical science, in particular, theragnostics, which refers to two kinds of word therapeutics and diagnostics [9]. It is an advanced technique in which cancer diagnosis and therapy is done simultaneously, for early detection and cure of the cancer [10,11]. To achieve this, some special metals in the periodic table include alkaline to alkaline metallics, rare metallics, and noble metallics used for theranostics application [12]. Compared to these metals, noble

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RESEARCH ARTICLE

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Impact of Soret and Dufour on bioconvective flow of nanofluid in porous square cavity

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Abstract

This article addresses the bioconvection in a porous cavity associated with Soret and Dufour effects. The bioconvective flow in a porous medium is based on Hillesdon and Pedley's model and is governed by nonlinear partial differential equations. These equations are transformed into a dimensionless form with suitable nondimensional parameters. The finite element method is employed to solve the dimensionless equations. The outcomes of the study are presented by streamlines, temperature distributions, isoconcentrations of solute, nanoparticles, and microorganisms. Furthermore, the tendency of average Nusselt number and average Sherwood number and the influence of Soret parameter, Dufour parameter, Peclet number, and bioconvective Rayleigh number is interpreted. Thermophoresis and Soret number show a strong effect on the concentration of nanoparticles. Brownian motion and thermophoresis exhibit a significant effect on the density distributions of microorganisms. The novelty of the paper is to combine the effects of Soret–Dufour and oxytactic bioconvection. The present study can be useful in the following applications: microbial-enhanced oil recovery, toxin removal, antibiotics, and modeling of microfluidic devices.

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Microwave Assisted Synthesis of 3-Chloro-N-(2-(5-chloro-1-tosyl-1H-benzo [d] Imidazol-2-yl) ethyl)-N-Substituted Quinoxalin-2-Amine Derivatives Using DCQX

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Abstract: The microwave assisted synthesis of 3-Chloro-N-(2-(5-chloro-1-tosyl-1*H*-benzo [*d*] imidazol-2-yl) ethyl)-N-substituted quinoxalin-2-amine derivatives is described. 2,3-dichloro quinoxaline (DCQX), as a starting compound and propargyl bromide, as an efficient alkylating agent are used in the synthesis of N-substituted quinoxalin-2-amine derivatives. We realized that microwave assisted synthesis is efficiently replacing conventional method of synthesis.

Keywords: 2,3-dichloroquinoxaline, quinoxaline, imidazoles, alkylating agent, microwave assisted synthesis

1. Introduction

There are several reported methods for the synthesis of quinoxaline-2-amine derivatives. Nevertheless, synthesis using 2,3-dichloroquinoxaline (DCQX) with nucleophilic species such as aryl amine has become a feasible substitute because of the presence of two chlorine atoms at C2 and C3 of DCQX. 2,3-dichloroquinoxaline (DCQX) is a reagent, extensively used as a synthetic intermediate in pharmaceutical industry as well as materials science [1,2]. Furthermore, this reagent is easily prepared from low-cost starting materials and commercially available.

One of the major advantages associated with the reactions of DCQX with nucleophiles is the possibility to control single or double substituted products. This exceptional feature of DCQX makes it significant in the synthesis of specific products that can be used in a variety of applications [3-7]. Propargyl bromide, an efficient alkylating agent is used for the N-alkylation of aryl amides. It is also used in enyne metathesis of propargylic amines, propargylation of spiro ketones, synthesis of allylic alcohols and enone complexes [8, 9].

The effective approach for the synthesis of quinoxalin-2-amines is the reaction between 1,2-diamines with aldehydes and isocyanides using CeO_2 nanoparticle catalyst. Also 3,4-dihydroquinoxalin-2-amines were synthesized by reactions between 1,2-diamines, ketones and isocyanides [10].

Reaction between 2,3-dichloro quinoxaline and anilines is a convenient method for the preparation of N-aryl substituted 3-chloroquinoxalin-2-amines, particularly, 2-(*N*-aryl amino)-3-chloroquinoxalines that are further converted into *N*-substituted 3-chloro-N-(2-(1-tosyl-1H-benzo [d]-imidazol-2-yl) ethyl) quinoxalin-2-amine [11]. This method is facilitated by $AlCl_3$ on forming C-N bond [1]. These target molecules were found to be potential inhibitors of phospho diesterase 4 (PDE-4) and have apoptosis inducing properties in an animal model (zebrafish) [12, 13]. Further, the reaction is facilitated in more effective way using an alkylating agent, propargyl bromide.

2. Results and discussions

All the compounds were synthesized using microwave irradiation. The synthesis of new compounds is described according to synthetic Figure 1. Compound 2 was synthesized from the starting materials, 2,3-dichloroquinoxaline (DCQX) and aniline, substituted at 4th position. Then compound 2 is irradiated with an alkylating agent, propargyl bromide in presence potassium carbonate and DMF to acquire compound 3 The final compound 3-Chloro-N-(2(5-chloro-1-tosyl-1H-benzo [d] imidazol-2-yl) ethyl)-N-substituted quinoxalin-2-amine (4) is obtained, when compound 3 was reacted with a

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Comparison of Substituent Effects in Benzenes (XC_5H_5C), Pyridines (XC_5H_4N) and Phosphorines (XC_5H_4P) and their Protonated Species

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Abstract Collection of interesting and stimulative data led us to construct Hammett plots for different properties like proton affinities, gas phase basicities, solvation free energies of free and protonated benzenes (I), pyridines (II) and phosphorines (III), and for pK_a values of protonated pyridines and phosphorines. Trends in Hammett reaction constants (ρ) for all these processes were discussed.

(I) (II) (III)

Keywords: *benzenes, pyridines, phosphorines, pK_a, proton affinities, gas phase basicities, solvation free energies*

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1. Introduction

Acuity of work in chemical education and chemical research that took a shape from literature reported data on several chemical and physical aspects like phase transition temperatures, dipole moments, surface tensions, attenuation effect, associative and non-associative behavior of liquids, stability and lifetimes of reactive intermediates, LFER, effect of hybridization of carbon on Hammett (ρ) and Taft (ρ*) reaction constants, prediction of pK_a values of unstable arenium ions and benzenes, from our group has been ever increasing in recent times [1-63]. In the present work to go a step ahead we have tried the comparison of substituent effects on pK_a, proton affinities, gas phase basicities, solvation free energies in benzenes (C_5H_6C), pyridines (C_5H_5N) and phosphorines (C_5H_5P) and their protonated species.

2. Methods

All the linear correlations were done using the KaleidaGraph software, Reading, PA, USA. All chemical structures were drawn using chemdraw software. All Hammett σ values are from reference 64.

3. Discussion

Hammett reactions constants (ρ) and pK_a data of arenium, pyridinium and phosphorinium ions are given in Table 1. The corresponding plots are shown in Figure 1, Figure 2 and Figure 3.

Since the Hammett ρ can not be determined for the dissociation equilibriums of arenium ions $XC_6H_6^+ \rightleftharpoons XC_6H_5 + H^+$ as they are highly unstable, an alternate and lucid method was adopted by us based on the attenuation effect [26]. Figure 1 shows the determination of the Hammett ρ for the dissociation equilibriums of arenium ions $XC_6H_6^+ \rightleftharpoons XC_6H_5 + H^+$ from the study of attenuation effect of methylene group ($-CH_2-$) on the dissociation equilibriums of anilinium ions, benzyl ammonium ions and 2-phenylethyl ammonium ions [26] and using the Andrew Williams' empirical equation $\rho = m1^{(2-i)}$ [65] where m1 is an arbitrary constant "i" is the number of atoms between ionizable proton and the ring carbon.

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Application of Hammett equation to hydrogen bond interactions of benzoic acid in chloroform/water system and explanation for non-linear Hammett relation to partition coefficients for the same system

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ABSTRACT

It is well known that benzoic acid distributes itself between chloroform and water. The partition coefficients (K_p) of seven different benzoic acids in chloroform/water are documented in the literature. Plausible hydrogen bonded structures of these seven benzoic acids with the two immiscible solvents were envisaged and the DFT calculation for these hydrogen bonds were carried out. Further, the conformity of Hammett relation to the hydrogen bond interactions was assessed. Application of Hammett equation to the hydrogen bonding of distribution of different *para*-substituted benzoic acids to these immiscible solvents is done for the first time. Further, an explanation for non-linear plot of partition coefficients logK_p of *para*-substituted benzoic acids in chloroform-water system versus Hammett σ value has been explained for the first time.

1. Introduction

Partition or distribution coefficients has a wide range of applications in the fields of pharmacology [1–3], pharmacokinetics [4–6], pharmacodynamics [7–9], environmental science [10,11], agrochemical research [12], metallurgy [13] and consumer product development [14]. Octanol is believed to have the lipophilic character of the biological membranes. The *n*-octanol/water [15] partitioning system resembles the lipid membrane/water systems in the body. Hence most of the partition studies appearing in the literature were carried out in octanol/water system. Over the last century numerous studies on partition of organic solutes have appeared in literature. To quote them is beyond the scope of this article as they run in several hundreds.

It is a well-established fact that Hammett [16,17] and Taft [18–21] equations are good mechanistic tools in physical-organic chemistry [16–21]. We have carried out several studies in our laboratory with regard to their application. Non-Linear Taft Relationship is applied to surface tensions of aliphatic acids: Inter-molecular hydrogen bonding versus intra-molecular hydrogen bonding [22], Non-Linear Taft Polar Free energy Relationships (TPER), reactions of *N*-substituted benzyl amines with benzyl bromide [23], dipole moments and melting points and their unsolved miracles on the application of Hammett equation [24] and application of non-linear Hammett relationship to surface tensions and dipole moments in estimating the associative behavior of phenols [25]. It is known that benzoic acid distributes itself between chloroform and water. We have considered the distribution of seven *para*-substituted benzoic acids. In the present study we envisaged the plausible hydrogen bonded structures (Scheme 1) and found the interaction energies in them. Further, we assessed the conformity of Hammett relationship to these interactions. To comprehend Hammett equation, let us suppose a reaction is performed on a substrate molecule [26] that can be represented as XGY where Y is the site of the reaction, X a variable substituent and G is a skeleton group to which X and Y (in our Scheme 1, X = OH, OCH_3, CH_3, H, Cl, Br and NO_2, Y is hydrogen bonding between COOH moiety of substituted benzoic acid and solvents, G is C_6H_4) are attached and we observe that changing X from H to CH_3, results in the change in the rate of reaction. The change in the rate of the reaction might be due to factors like mesomeric effect or inductive effect of the substituent X. The first attempt of quantitative treatment of X on the reaction site was given by Hammett. For the cases of meta and *para*-XC_6H_4Y, Hammett set up the equation $\log (k/k_o) = \sigma\rho$ and this equation is known as Hammett equation. Here k_o is the rate or equilibrium constant for X = H, k the rate or equilibrium constant for group X, ρ is a constant known as Hammett reaction constant for a given reaction under a given set of conditions, and σ is a constant known as Hammett substituent constant. Hammett substituent constant σ reflects

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Investigation on natural convective flow of ethylene glycol nanofluid containing nanoparticles Fe_3O_4 in a porous cavity with radiation

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