GCET/013/2018-19, Dt. 10/08/2018

Tele: 011- 23007335

Telefax: 011-23017582

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 (ER&IPR)
DRDO Bhawan, Rajaji Marg, DHQ PO
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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Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

(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. 011001S

(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.

49

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.

45

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

9/20/02

Encl: a/a.

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

59

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
Please 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.
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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.

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

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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

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Literature Review

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

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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 Ψ =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.

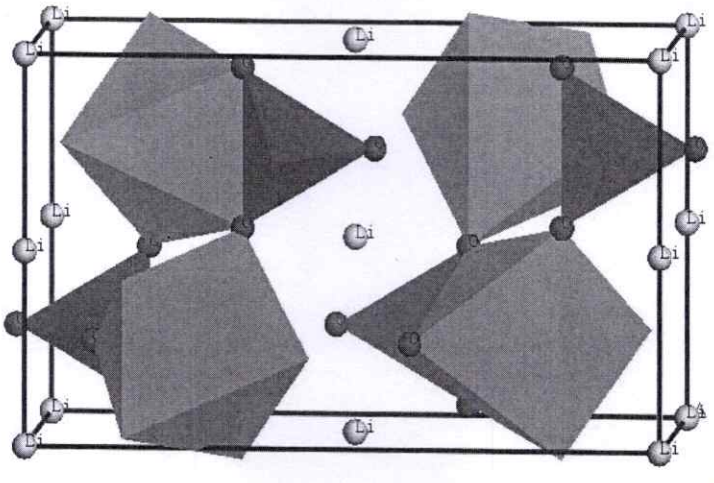

FIGURE.1 Crystal Structure of LiFePO4 Nanocomposite Material.

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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), Maïti & 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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18-19 -(2)

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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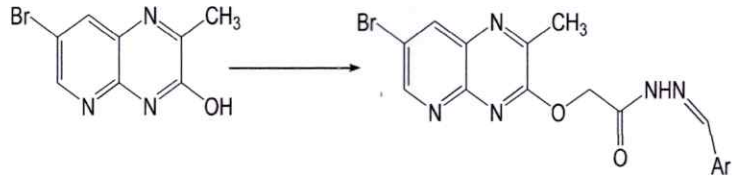
ABSTRACT

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

$$f(z)=\frac{1}{z}+\sum_{n=1}^{\infty}a_n z^n,\ z\in U^*, a_n\geq 0 \text{ for } n=1,2,3,.... \tag{1.1}$$

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

$$-Re\left\{1+\frac{zf''(z)}{f'(z)}\right\}>\alpha,\ z\in U^*$$

18-19 — (9)

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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, $XC_6H_6^+$) and methanium ions (super acids, RCH_4^+) are more susceptible to substituent

18-19-(10)

Application of dielectric mixtures formulae to PbTiO$_3$ based glass-ceramic systems

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24

18-19 - (13)

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on dynamics of L-alanine in water medium investigated by ic 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

V. Sirisha [1], V. Satya Srinivas* [1], and P Rajini[2]
(1) Department of ECE, Geethanjali College of Engineering and Technology, Cheeryal(V), TS, India, http://www.geethanjaliinstitutions.com/engineering/
(2) Department of Mathematics and Statistics, Bhavan's Vivekananda College, Sainikpuri, Secundrabad, TS India, http://www.bhavansvc.org/

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)

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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.

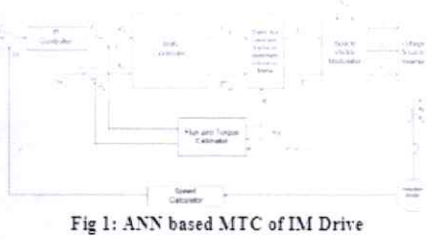

Fig 1: ANN based MTC of IM Drive

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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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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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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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.

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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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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/ 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:

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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.
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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.
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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.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: ps2registrar@jntuh.ac.in

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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. VADAIAH REGISTRAR

Procs No.JNTUH/TEQIP-III/CRS/2019/ Mathematics/01 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.
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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. [redacted]

2. Total Project Cost Rs. 2,00,000

   Sanction Revised Project cost (If applicable) Rs. 2,00,000

3. Date of Commencement of Project 15/09/2019

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: Sudha

b) Co-Investigator-I

c) Co-Investigator-II

Geethanjali College of Engineering & Technology Sy. No. 35 & 36 Cheeryal Village Keesara Mandal

Signature of the Head of the Institution with Seal

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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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url: http://www.acadpubl.eu/hub/
Special Issue

http://www.acadpubl.eu/hub/

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 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

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

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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],

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

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

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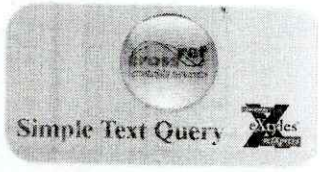
Abstract

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 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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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 com rise 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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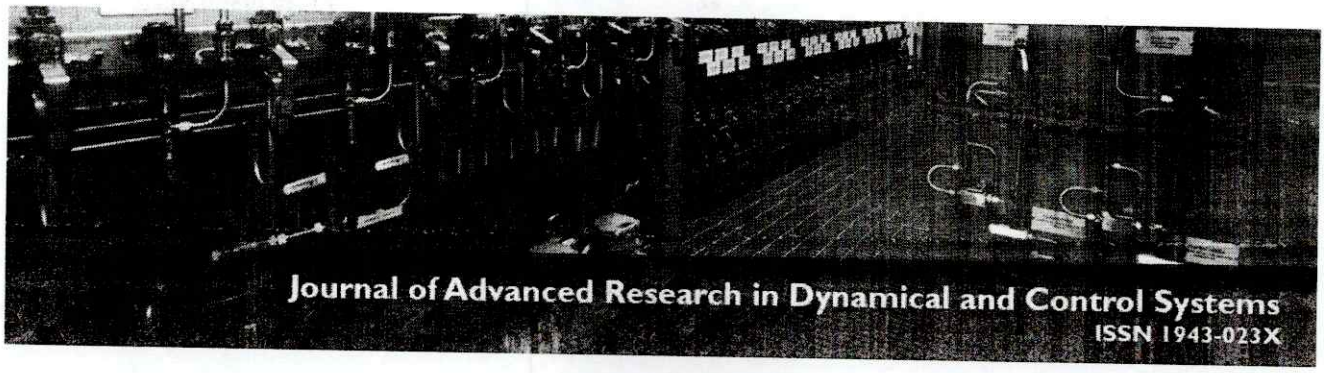

Software Defined Radio with LFSR and Hard Decision based Viterbi Decoder

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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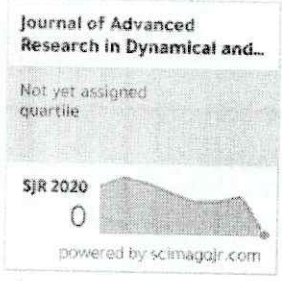

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IMPLEMENTATION OF HIGH SPEED VEDIC BCD MULTIPLIER USING VINCULUM METHOD

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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 servomechamams 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.

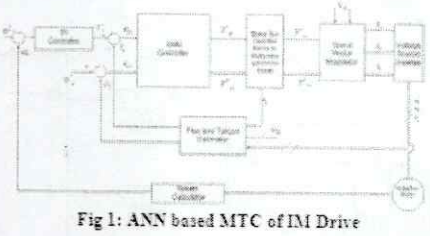

Fig 1: ANN based MTC of IM Drive

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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