**3.4.4 Number of books and chapters in edited volumes / books published, and papers in national/international conference proceedings year wise**

**Enclosed first page of conference paper/book/ chapter**

**(A.Y. 2017-2018)**

# Classification of Medicinal Plants: An Approach using Fuzzy Local Binary Pattern with Interval Valued Symbolic Representation

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**Abstract:-In this paper, a method to extract the features of leaf texture of medicinal plant leaves with Fuzzy Local binary patterns (LBP_F) approach is proposed. The extracted feature data set is reduced with numerical approximation approach. To evaluate my approach, Flavia data set is chosen and experiments are conducted on this data set to classify the medicinal plant species. The classification results obtained are more encouraging and the results obtained with the proposed approach are better than the conventional LBP approach.**

*Keywords:Texture, Leaf Classification, Local binary patterns, Flavia data set,*

## I. Introduction

Ayurveda is the science of medicinal plants originated from India. It is described from the ancient ages that Ayurveda is the transmission of knowledge from Gods to sages and then to human physicians. Researchers considered the Ayurveda as protoscience and it will balance both the physical and mental conditions. Machine learning techniques will be applied to identify Ayurvedic medicinal plants and classification of medicinal plants will play a major role to design an expert system.

Herbarium in the digital form is available online to provide the information about plant species. Scientists possessing explicit knowledge on plant taxonomy finding difficult in identifying plant species. For a given text based query, information from virtual herbarium databases can be obtained but they are not accurate. Hence there is a need for computer vision experiments to obtain the information based on image for a given text query. Plant species can be identified from the properties like colour, shape and texture. Texture plays an important role in classifying plant species, apart from shape and colour.

## II. Literature Review

Several authors have proposed data mining techniques to classify the plant leaves based on their shapes and surface textures, but texture plays an important role in identifying the properties of plant leaves for similar shapes.

Wang et.al. has identified the plant leaves based on the properties like eccentricity form factor, perimeter ratio of convex hull, circularity, rectangularity and aspect ratio to describe the local features of a plant leaf for recognition[2]. Stephen et.al. has evaluated physiological width and physiological length of a plant leaf based on the geometry of the shape and classified the plant species with morphological features and made it online with a huge data set of plant leaf images[3]. Zeng et.al. has classified the plant leaves based on shape descriptors using the Histogram of gradients[10].

Several mathematical models have been developed for object recognition and classification of artificial textures[1]. Feature distribution models are popular as compared with texture models in describing the texture pattern because of its theoretical simplicity. To determine the uniform patterns in texture a generalized gray-scale rotation invariant Local Binary Pattern operator(LBP) of any quantization of the angular space has been proposed[6]. Further, Local Binary Pattern operator is enhanced by combing the operators with varying spatial resolutions for multi resolution analysis of different surface textures. A new biometric system has been proposed to extend the concept of LBP with varying radius to determine the finger print images[7]. Finger print images are decomposed into overlapping sub images and each sub image is convoluted with Gabor filter to identify the local features for classifying the LBP features of convoluted sub images. Alexander et.al. has proposed a pixel pattern texture feature vector (PPBTF) method for gender recognition[8]. To obtain the local features, a pattern map is constructed with the geometry of shapes of edges and lines. Principal component analysis technique is applied to evaluate the eigen values of the feature data set and developed an expert system for gender classification.

It is observed from the literature review that several methods are exposed to classify the plant species and tried to develop an expert system for recognizing the plant species. Most of the models are explained based on the shape features for classification of plant leaves to describe plant taxonomy. The classification models described based on shape features will vary from one plant species to another and these models are not able to explain for similar shapes of plant leaves for two different species. To differentiate plant species with similar shapes, texture models to capture leaf texture is

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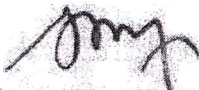## CERTIFICATE OF PRESENTATION

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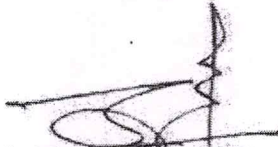
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# THINKING WEB TECHNOLOGIES

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# Alternative Reliable routing for Reactive based routing used on recovery management in AODV route optimistic properties.

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*Abstract- Wireless reliable routing protocols in reactive ad-hoc routing creates a path between source and destination route depends on time of necessity. Reactive ad-hoc routing protocols the common problem is dynamic route creating in when the route path is not found at that point in time. To overcome this problem we need the route recovery process at the time of the route failed. We proposed the route maintains with the new approaches depends on time to live. To find the intermediate node level, failure and provide the update of routing the alternate path at the same time, so we are taking AODV routing protocol and simulated in omnet++.*

*Keywords: end to end network delay, the network routing message overhead, the path link break, adhoc reactive protocols.*

## I. INTRODUCTION

Wireless networks in the ad-hoc are utilized in most real-life applications. The wireless adhoc networks have depends on prearchitecture such of the point of access and the wifi-routers. The adhoc networks are not need for pre define infrastructure. The routing statute is one along with the essential of the ad-hoc networks they are changing topology dynamically of each network node.

The adhoc network routing protocols are mainly two units into the table drive and on-demand fundamentally. The table drive type is need for interchanging routing information fixed time intervals. In the table driven shows on routing overhead. The on-demand protocol creates the routes between the sources and destination using OLSR type protocols; in this network overhead is very low. With the exception of re-generate the latest route in place of route failure. The DSR and AODV routing are taking to consider. We are taken to a very low overhead in on demand routing protocols. However, the reactive routing is reinstating the latest route at that route failure.

We propose a route management PFA-AODV (Path failure Avoidance in AODV) to avoid the failure of path link based as consider default aodv protocol and simulation and comparisons in between protocols.

## II. RELATED WORK

Reduce the quantity of packet loss and end-to-end network interruption [1].finally we are improving the route building with backup with numerous paths between source and destination. The proposed protocol to build route management is route information updated locally [3]. Collection of multiple routes is build along with the active route, depends on priority, It will be selecting the route when the active route fails. The swatch active route to the new adept the highest priority route with dynamic changes is made using local route management.

In RREQ messages maintains less propagating control messages, the same can be used in the proposed protocol with multiple path enhancements. The RREP is received the node then internal local route management creates the new route for the existing route, otherwise each supporting nodes builds RREP the route sends the source node. The RREP can palely identify the other routes and mantling backup buffer. When the active route link path is break it the broadcast sender node, the RERR packet at the same time. At that time neighboring node has some other path it will be forwarded.

The route management procedure with common metrics of delay and link break hops, every intermediate node work selects of alternate paths with less routing overhead packets [4].

The enhancement of RREQ and RREP packet updates on the source route and all intermediate node hops count the multiple routes in that time.

Depends on the metrics of the route discovery process of every intermediate node maintains the reverse and forward route. The proposed protocol specifies 2 methods with the different metrics. The 1 is based on the hope count, the delay of RREQ and RREP packets the reverse and forwarded directions. In manner re-casting is needed. The 2 is delay reducing, the RREQ and RREP packets are accepted the arrival order without any recasting. The proposed protocol cans small changes principle. If the delay packet leap calculation is greater than the TTL, the packet is not

# A Novel Approach for Recoding Canonical Signed Digit

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*Abstract* - In this study new approaches for conversion of regular unsigned or signed number into canonical signed digit are presented. We evaluate the proposed circuit and compare it with a circuit based on the conventional adder structure. We show that the proposed architectures perform faster by 8% or more than the circuit based on the conventional structure. In this work different adder logics to generate fast carry are used in canonical signed conversion method. As a result, the proposed circuits are efficient in terms of speed, area and power consumption in comparison with other conventional architectures. Simulations of different configurations are performed using Xilinx and synthesized using Cadence tools. These logics are applied to Wallace multiplier by applying CSD conversion to multiplier and /or multiplicand which gives far better results than counterpart previous architectures.

*Keywords* - canonical-signed-digit (CSD), Booth's Recoding, adders

## I. INTRODUCTION

Asked for the total of thirty four and sixty two, some folks could even be ready to work this out while not pen and paper. However, most folks would struggle to search out the merchandise (unless we all know our thirty four times tables). Another, maybe additional vital reason for the distinction in issue is that the variety of operations that should be performed. To do the addition, I will break the matter down into 2 little additions, 4+2 = six and 3+6 = nine. In fact it is also potential that there's a carry I actually have to require care of, however we'll ignore these in our analysis. Currently contemplate the multiplication. I actually have to try and do 2×4 = eight, 30×2 = 60, 60×4 = 240 and 30×60 = 1800. Currently i would like to feature of these along. So, in total four easier multiplications we've got to try to and 3 additions. This method is typical for multiplication using school text algorithms.

Digital FIR filter is one in every of the essential elements in Digital Signal method (DSP) and communication system. With Associate in Nursing large growth in mobile computing and multimedia system applications, would like for low power and high speed DSP system has seen a tremendous growth [1]. Digital filters square measure accustomed modify the attributes of signal by removing noise from the initial signal and kind the spectral characteristics of the following signal [2]. Digital filters are superior in level of performance as they're extremely stable, correct and versatile as compared to analog filter [3]. Due to

this reason, the necessity of a digital filter with optimized space, power and delay may be a difficult task. DSP applications need an oversized order FIR filter. And therefore the complexity will increase with increasing filter order owing to needs of larger mathematical computations [5]. Therefore, real time implementation of this filter with precise value is sitting as a heavy challenge. so as to attain efficient digital filter style, order of filter should be as little as doable. This paper focuses primarily on the FIR filter owing to its absolute stability and linear part response [6].

This paper focuses mainly on the FIR filter due to its absolute stability and linear phase response [6]. On the premise of hardware, digital filter may be classified into 2 major categories: multipliers based mostly and memory based [7]. The most components of digital filter embrace registers to save lots of the samples of signals, adders to carry out total operations and variety for multiplication of the filter coefficients with signal samples [8]. Even with the particular undeniable fact that designing of digital filter seems straightforward, but the planning bottleneck is its number block for speed, house and power consumption [9]. Complexness is primarily dominated by constant multiplication operation [10,11]. therefore on cut back quality, the filter coefficients square measure depicted in CSD illustration that wants the littlest quantity form of Computations [12].The multiplication of 2 numbers x*y is enforced by accumulating the shifted partial product xiy, for every digit xi of the multiplier x.

So, the amount of necessary addition operations needed to total the partial product is one less than the amount of nonzero digits within the illustration of the corresponding constant number x. the event of quick CSD and MSD conversion algorithms has been the main target of a lot of effort. Booth's coding was given [13] in 1951, to expeditiously multiply 2 numbers using coding multipliers. In 1960, Reitwiesner developed an rule to convert two's complement numbers to CSD [14].

The remaining of the paper is organized as follows: an outline of CSD is given in section II. Section III consists of various adder logics for quick carry generation. Section IV describes the planned work for CSD improvement. In section V simulation results are mentioned. Finally, section VI concludes the paper by summarizing the foremost contributes.

# EFFICIENT VEDIC SIGNED DIGIT DECIMAL ADDER

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**ABSTRACT:**

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

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

## 1. INTRODUCTION:

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

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

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

## 2. BASIC BACKGROUND ON VEDIC VINCULUM NUMBER REPRESENTATION:

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

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

### 2.1 Vinculum Representation of Numbers

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

# Implementation of Touch Detection With Virtual Keyboard Using Raspberry Pi

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**Abstract—** In this paper, we propose a novel interactive projection system (IPS), which enables bare-finger touch interaction on regular planar surfaces (e.g., walls, tables), with only one standard camera and one projector. The challenge of bare-finger touch detection is recovering the touching information just from the 2-D image captured by the camera. In our method, the graphical user interface (GUI) button is projected on the surface and is distorted by the finger when clicking it, and there is a significant positive correlation between the button's distortion and the finger's height to the surface.

Therefore, we propose a novel, fast, and robust algorithm, which takes advantage of the button's distortion to detect the touch action. The proposed touch detection algorithm is performed in three stages: 1) region of interest extraction through a homography mapping, by which the computational complexity of the following processing is reduced; 2) the button's distortion detection using a special edge detection algorithm, which greatly reduces the errors due to the influence of the finger's shadows and edges; and 3) touch action judgment by the button's distortion. Several applications (e.g., virtual keyboard, power point viewing), which use the proposed touch detection method based on the buttons, are shown in this paper. An evaluation is performed on the virtual keyboard and the results demonstrate that the proposed approach can detect bare- finger touch in real time with the missed detection rate of 1.00%, false detection rate of 2.08%, and touch detection rate of 96.92% at the typical projected distance.

**Index Terms-** Edge detection, human–computer interaction, projector–camera system, touch detection, triangulation.

## I. INTRODUCTION

Mobile Devices (e.g., mobile phones, pads) with significant computational power and capabilities have been a part of our daily life. Benefiting from the small size of these devices, they are easy to carry. However, the screen real estate of today's mobile devices is limited by their small sizes. This greatly diminishes their usability, functionality, and comfort. A Pico projector can be used to significantly increase the limited screen size of the mobile devices. With the development of the projection technology, we believe that embedded projectors in the mobile phones will be very common in the future, and

people will enjoy a way of displaying digital contents on everyday surfaces. Meanwhile, the interactions (e.g., touch, gesture) on the projected display are thought to be appealing. To achieve the touch interaction, the biggest challenge lies in how to determine whether the fingers touch the projected surface or not. Most of the researchers in this area use multi cameras or a depth camera to obtain the relative position between the fingertip and the projected surface.

The existing keyboards used keys based keyboard for typing on the computer. These keyboards are working on the mechanical push principle. But for the small devices like mobile phones and tablets it is impossible to carry big keyboard with them. The touch screen based keyboards available in such devices are very inconvenient to write because the size of people finger is big and the size of the keys on the touch screen is small. So typing work on the small devices is not convenient and on computer our fingers get pain after doing long time typing work because of mechanical vibration of the keys.

## II. PROPOSED METHOD

In the proposed method, we propose an interactive projection system (IPS), which enables bare-finger touch interaction on regular planar surfaces (e.g., walls, tables), with only one standard camera and one projector.

The challenge of bare-finger touch detection is recovering the touching information just from the 2-D image captured by the camera.

In our method, the graphical user interface (GUI) button is projected on the surface and is distorted by the finger when clicking it, and there is a significant positive correlation between the button's distortion and the finger's height to the surface.

Therefore, we propose a novel, fast, and robust algorithm, which takes advantage of the button's distortion to detect the touch action.

We design a hardware system on interactive projection system. Our system is designed by using ARM 32-bit micro controller which supports different features and algorithms for the development of automotive systems. Here the camera and projector are connected to ARM controller.

We are projecting a GUI on surface by projector and camera for capturing GUI, The camera will capture the places where user put his finger and the movement of the finger.

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

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

**Keywords: Decimal numbers, BCD numbers, Vinculum numbers**

## Introduction:

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

In this paper we have proposed a new method for decimal addition and subtraction using two's complement number system and Vedic vinculum method. Two's complement approach is normally used in binary addition and subtraction. To our knowledge very little literature is available on BCD Addition and Subtraction using Vedic mathematics. We have tried to investigate the use of 2's complement number system to represent vinculum numbers to solve the problem of BCD Addition and subtraction. Our Analysis shows that this

approach is viable and efficient. Theoretical analysis shows that the number of carry bits generated from one digit to other digit are very less when compare to conventional (decimal) number systems.

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

## 2 Overview of Number systems:

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

### 2.1 Digits:

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

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

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# Floating Point Vedic Multiplier Using Parallel Prefix Adders for Signal Processing Applications

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**Abstract - This paper presents a new architecture of Floating point Vedic Multiplier which operates on Vedic Mathematics called Vedic Sutras. It uses a method called Urdhav Tryakbhyam to multiply two mantissas in which kogge stone parallel prefix adder is used to add partial products. Vedic Mathematics is an emerging field where lot of research is going on Vedic mathematics and its implementation for engineering applications. Among all arithmetic operations like addition, subtraction, multiplication and division, multiplication takes longer time for computation. So this paper is focused on reduction of delay and number of LUT's when compared to conventional multipliers. The Architecture is implemented using Xilinx Vertex 6 FPGA and the results indicate that the proposed Multiplier is very efficient in terms of speed when compared to decimal multipliers implemented with direct manipulation of floating point formats. It has been observed that improvement in speed is about 1.05 times on Vedic multipliers which is suitable for Digital signal processing applications.**

**Key words - Floating point Multiplier, Urdhav Triyakbhyam, Kogge stone Adder.**

## 1. INTRODUCTION

Floating-point operations have found intensive applications in various fields of signal processing where high precision is required. Demand in multimedia applications for high performance and low-power digital signal processing is getting higher and higher FIR digital filters are one of the most widely used fundamental devices performed in DSP systems. Few applications require high frequencies whereas few other applications require high through put with a low-power circuits. The proposed multiplier uses a combination of Vedic mathematics with high speed parallel prefix adders for high speed and low power applications.

The outline of the paper is arranged as follows. In section 2 Floating point Format concepts is presented. In Section 3 Concepts of Vedic Mathematics and Sutras related to multiplication is presented. In Section 4 Detailed description of Proposed Floating Point Vedic Multiplier with parallel prefix adder structure is explained. Simulation and Synthesis results are discussed in Section 5 and Conclusion with future scope in Section 6.

## 2. FLOATING POINT MULTIPLIER

There are two types of arithmetic which are performed in computers: integer arithmetic and real arithmetic. Integer arithmetic is simple. A decimal number is converted to its binary equivalent and arithmetic is performed using binary arithmetic operations.

The largest positive integer that may be stored in an 8-bit byte is +127, if 1 bit is used for sign. If 16 bits are used, the largest positive integer is +32767 and with 32 bits, it is +2147483647, quite large. The first is to decide how many bits are needed to encode real numbers and the second is to decide how to represent real numbers using these bits.

Normally, in numerical computation in science and engineering, one would need at least 7 to 8 significant digits precision. This range of real numbers, when fixed point representation is used, is not sufficient in many practical problems. Therefore, another representation called normalized floating point representation is used for real numbers in computers. In this representation, 32 bits are divided into two parts: a part called the mantissa with its sign and the other called the exponent with its sign. The mantissa represents fractions with a non-zero leading bit and the exponent the power of 2 by which the mantissa is multiplied. This method increases the range of numbers that may be represented using 32 bits. In this method, a binary floating point number is represented by (sign) × mantissa × 2± exponent where the sign is one bit, the mantissa is a binary fraction with a non-zero leading bit, and the exponent is a binary integer. If 32 bits are available to store floating point numbers, we have to decide the following:

1. How many bits are to be used to represent the mantissa (1 bit is reserved for the sign of the number).
2. How many bits are to be used for the exponent?
3. How to represent the sign of the exponent.

The number of bits to be used for the mantissa is determined by the number of significant decimal digits required in computation, which is at least seven. Based on experience in numerical computation, it is found that at least

# A Robust Hybrid Video Watermarking Algorithm Using NSCT and SVD

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*Abstract-* **The fast progress in digital techniques and internet utilization brought new problems viz. copyright protection and authentication of the multimedia data namely image, audio and video. The watermarking technique is widely used as a potential solution to address these issues by incorporating additional information called "watermark" into the data of multimedia. An optimal hybrid watermarking method is introduced by exploiting the properties of nonsubsampled contourlet transform (NSCT) and singular value decomposition (SVD) for uncompressed videos in this paper. The proposed video watermarking algorithm is an additive and non-blind, which necessitates the presence of every frame of original video for watermark extraction / detection. In this approach, the original video frame and the watermark are decomposed simultaneously by nonsubsampled contourlet transform. The singular values of each frame of original video are altered with that of singular values of corresponding watermark with appropriate scaling factor. Here, different watermarks are incorporated in different scenes of original video to enhance the robustness for attacks. Experimental results show that the combination of NSCT-SVD based hybrid watermarking algorithms exhibit a better imperceptibility and robustness to various attacks, namely, rotation, cropping, color to gray scale conversion, salt and pepper noise, and frame dropping. The performance of this method is examined with the existing watermarking methods, and observed a better performance in quality of video frame and robustness to various attacks.**

*Keywords - singular value decomposition, nonsubsampled contourlet transform, normalized correlation coefficient, signal to noise ratio, video watermarking*

## I. INTRODUCTION

The steep development in the growth of the Internet and multimedia techniques emphasize the requirement for methods to take care of proprietorship of digital media. Identical copies of digital information such as image, text, audio or video, could be reproduced simply without loss of considerable fidelity. Digital watermarking is a potential approach by which a solution to the problems deal with authentication of multimedia data could be achieved by embedding some information called watermark such as copyright messages, ownership identifiers, random number sequence, binary/gray scale images and text into the multimedia data. Subsequently the watermark can be extracted to assess the authenticity of data. These watermarks stand unchanged during transmission or any transformation. The absence of watermark in already watermarked data would reveal that the data has been modified. It is required that the embedded watermark is invisible, robust and should possess a high capacity. The Invisibility means the amount of alteration received by the watermark and its effect on the observers while the robustness is the withstanding of an embedded watermark versus intentional and normal video processing operations namely noise, filtering, rotation, scaling, cropping , and lossy compression, etc. The capacity refers to the extent of data that can be represented by a watermark [1].

The phenomenon of video watermarking and that of image are similar; however, they are not identical. The watermarking of video brings some issues which are commonly not encounter in images. Any image watermarking approach can be extended to the video watermarking [2].

There are basically two approaches available, namely spatial and transform domain. In spatial domain approach, the watermark is embedded in the original video by simple addition or bit replacement of chosen pixel locations. The prime advantage of applying spatial domain technique that it is conceptually straightforward to comprehend and is less complex in implementation [3]. But, these techniques generally do not provide enough imperceptibility and robustness for attacks. In transform domain approach, the original video is converted into frequency domain using various transforms and watermark is embedded in particular coefficients of selected bands [4]. In this paper, NSCT is opted for watermarking with the combination of SVD, which ensures a better robustness and imperceptibility against various attacks.

The simulation results reveal that the proposed algorithm extracts almost similar watermark embedded under various attacks. The proposed approach is compared with another video watermarking approach which is based on the combination of contourlet transform (CT) and singular value decomposition (SVD) [5]. The rest of the paper is arranged as follows. The nonsubsampled contourlet transform is described in section II, section III explains singular value decomposition, the details of the proposed method is illustrated in section IV, in section V simulation results are discussed, and in section VI conclusions are given.

## II NONSUBSAMPLED CONTOURLET TRANSFORM

A new image decomposition transform, the non-subsampled contourlet transform is proposed by Arthur L.Cunha, et al [6].The NSCT is more adequate in describing smooth contours in different directions in an image than that of Discrete Wavelet Transform (DWT) and Contourlet Transform. The NSCT is a fully shift invariant, multi-scale, multi-direction expansion. It has redundant features due to

# STUDIES ON NOISE AND SIGNAL TO NOISE RATIO IMPROVEMENTS FOR AN IN HOUSE DEVELOPED MIE LIDAR

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## ABSTRACT

A Multi-wavelength laser radar has been designed and developed in-house and made operational at the location Cheeryal Village (17.51° N, 78.62° E), which is at a distance of about 20 Km in the suburbs of Hyderabad, India. The Nd:YAG laser (M/S Bright Solutions, Italy) based multi-wavelength lidar operates at 532 nm and 1064 nm with a pulse energy of 50uJ at both the wavelengths. The two wavelengths are generated coaxially with a pulse width of 10ns and the laser operates up to a PRF of 4 KHz. The receiver system consists of a 360 mm Newtonian optical telescope, 10 nm of interference filters and the Licel Gmbh, Germany make 250 MHz Photon Counting recorder. In this paper we present the different sources of noise and their probability density functions and noise estimations. The signal to noise ratio improvements are carried out on the data to the in house developed lidar system such as threshold, coherent and incoherent averaging.

Keywords:

Lidar, Remote sensing, noise, signal to noise ratio, averaging

## 1. Introduction

Lidar is an acronym for light detection and ranging. Lidar systems are laser based systems that operate on principles like that of radar (radio detection and ranging). In the case of lidar, a light pulse is emitted into the atmosphere. Light from the beam is scattered in all directions from molecules and particulates in the atmosphere. A portion of the light is scattered back toward the lidar system. This light is collected by a telescope and focused upon a photo detector that measures the amount of back scattered light as a function of distance from the lidar. The interaction of the emitted laser beam with the atmospheric constituents causes alterations in the intensity, polarization and wavelength of the backscattering light. From the measurement of these parameters of the received backscattered light one can deduce the properties of the atmosphere and its constituents. As the laser is pulsed the lidar methods allows the range resolved measurement to obtain the vertical profile of the parameter being studied. Lidar systems are used in the wavelength range extending from the Ultra Violet to the Infra-Red (UV to IR) by using different types of lasers. Elastic lidars, in which the transmitted and scattered back signals are at same wavelengths, aims to detect Rayleigh and Mie scattering from atmospheric gas molecules and aerosols respectively. These types of scattering are characterized from the detection of a photon by a gas molecule or dust particle in an elastic collision, meaning that the energy of the photon is conserved. It can map aerosol concentration in the atmosphere and to determine aerosol particle size (M. Hess, P. Koepke, and I. Schult, 1998) [1]. This makes lidar an enormously useful tool for investigating air-quality, both generally and in the context of agricultural operations in particular. In fact, the use of lidar to map particulate matter (PM) concentration and estimate aerosol emission rates from an agricultural facility has been demonstrated previously, and lidar has been proven to be a versatile tool for investigating atmospheric aerosols and a useful means of characterizing and monitoring the air-quality impact of industrial and agricultural operations (M. D. Guasta, et.al, 1994) [2]. The field of laser remote sensing has grown rapidly in recent years. The growth has been stimulated by the potential application of remote sensing systems to a wide variety of atmospheric measurements.

# Lidar studies on atmospheric aerosols at a semi-urban station Cheeryal (17.51° N, 78.62° E) near Hyderabad, India

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## ABSTRACT

It is well established that atmospheric aerosol play a vital role both directly and indirectly in the Earth's radiation budget. The transport of anthropogenic aerosol from the urban locations increases the aerosol loading in the surrounding semi-urban regions. The solid waste disposal in the semi-urban regions also adds up to the total anthropogenic aerosol density in the region. In this study we investigated the aerosol characteristics in the *Cheeryal Village* (17.51° N, 78.62° E), which is located at a distance of about 20 Km in the suburbs of Hyderabad, India. A multi-wavelength laser radar was developed in-house and made operational at this location about 2 years back. The Nd:YAG laser (M/S Bright Solutions, Italy) based multi-wavelength lidar operates at 532 nm and 1064 nm with a pulse energy of 50uJ at both the wavelengths. The two wavelengths are generated coaxially with a pulse width of 10ns and the laser operates up to a PRF of 4 KHz. The receiver system consists of a 360 mm Newtonian optical telescope, 10 nm of interference filters and the Licel Gmbh, Germany make 250 MHz Photon Counting recorder. Lidar observations are conducted on relatively clear days during the one year period from January 2014 to December 2014. The aerosol extinction profiles are derived and compared with the model values corresponding to the Hyderabad urban region. It is observed that there is a heavy aerosol loading periodically at this location in relation to the sources of anthropogenic aerosols at Hyderabad urban area. The role of prevailing meteorological conditions, measured in real time, on the transport of the urban aerosol to this region is studied.

Keywords:
Lidar, Remote sensing, Anthropogenic aerosols, Semi-urban region, transport of aerosols

## 1. INTRODUCTION

In the present day context, modifications in the Earth's climate due to human activities are one of the very important issues in the environmental research. The role of aerosols, particularly anthropogenic type, air pollutants, clouds, water vapor and ozone is not fully understood as yet. A comprehensive study on the characterization of the aerosol properties including their vertical profiles along with the measurement on the concentration profiles of water vapor, ozone and temperature simultaneously will yield valuable information needed for understanding their role in the global climate and its change. The field of laser remote sensing has grown rapidly in recent years. The growth has been stimulated by the potential application of remote sensing systems to a wide variety of atmospheric measurements. Further the fast technological advances in lasers, detectors, signal processing and data acquisition systems taking place are facilitating the development of new techniques and versatile systems which offer very high vertical resolutions and accuracies in measurement. Laser remote sensing of the atmosphere is generally referred to as LIDAR, the acronym for Light Detection and Ranging. Similar to RADAR, in LIDAR, a laser light pulse into the atmosphere and is used as a spectroscopic probe of its physical state and composition. The emitted laser beam interacts with the atmospheric constituents, causing alterations in the intensity, polarization and wavelength of the backscattering light. From the measurement of these parameters of the received backscattered light one can deduce the properties of the atmosphere and its constituents. As the laser is pulsed the lidar methods allows the range resolved measurement to obtain the vertical

## THEME: Nanotech for Energy and Environment

# Synthesis of nanostructured $LiMn_{1.5}Cu_{0.5}O_4$ by CAM microwave assisted sol-gel method as cathode for LIB in BEES Systems

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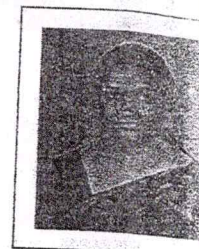
## ABSTRACT

high voltage, high power and stable non toxic cathode materials is gaining attention due to increasing demand of LIBs in Battery Electrical Energy Storage (BEES)Systems.  This paper explains the preparation of thermally stable high voltage $LiMn_{1.5}Cu_{0.5}O_4$ spinel synthesized by Citric Acid Modified (CAM) microwave assisted sol-gel method. The synthesized sample was characterized using XRD, FESEM, TEM, CV and Electrical investigations. Our powder XRD analysis shows that the sample has pure single phase and have good crystallization in the range of 20-30 nm. The lower weight loss as observed from TG/DTA graphs represents nano crystalline $LiMn_{1.5}Cu_{0.5}O_4$ is thermally stable. The electrochemical studies on nano structured $LiMn_{1.5}Cu_{0.5}O_4$ shows single phase behavior in (4-5)V potential region with good cycling property. The impedance spectra of this electrode consist of semi circles in high and intermediate frequency range. The morphological studies exhibit homogeneous particle distribution with similar shape. This uniform distribution is attributed to the microwave treatment, which shortened the synthesizing time and has overcome the agglomeration of particles. This kind of morphology is very important to both the high specific capacity and good cyclability of the material. Smaller particle size results faster diffusion of Li to produce effective charge transfer that results in the capacity of the nanostructured materials which are better than generic LIB materials at high rate with good reversibility. Therefore, the nanostructured $LiMn_{1.5}Cu_{0.5}O_4$ is a suited cathode material for LIB applications in BEES systems.
Keywords: LIB; BEES; CAM Microwave; XRD; Intercalation

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## IL 98

# "Synthesis, Characterization and DFT Studies of Nano Scaled Lithium Ion Battery Materials for Renewable Energy Storage"

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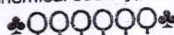[3]EEE Department, JNTUCE, JNTU Hyderabad 500085, India.
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Energy storage and conversion have become a prime area of research to address both the societal concerns regarding the environment and pragmatic applications. The development of renewable energy resources together with more efficient technologies for energy conversion and storage is one of mankind's key challenges. The enhancement of energy conversion and storage technologies (fuel cells, solar cells, batteries, super capacitors, etc.) needs to be improved to enable better use of intermittent renewable electricity sources and to develop sustainable transport solutions associated with a modern society. The fact that output power of renewable energy sources such as solar and wind power plants depends on meteorological conditions. Lithium ion batteries are getting enormous attention as power source and energy storage devices in Renewable energy field[1-3].

The performance of the battery is improved by developing the high power density cathode materials at Nano level. Batteries with Nano scale materials develop more power quickly with less heat. This work explains the synthesis of most interesting cathode materials with Lithium Manganese Spinel $LiMn_{1.5}Cu_{0.25}Ni_{0.25}O_4$ with 25% replacement of Mn by Cu and Ni to avoid capacity fading. $LiMn_{1.5}Cu_{0.25}Ni_{0.25}O_4$ is synthesized using eco-friendly co-precipitation methods.Synthesized powders were characterized by XRD, FESEM,EDAX,HRTEM,UV,electro chemical characterization(CV,) and thermal (TGA/DTA) characterizations then compared the experimental results with computational results s from DFT calculations using Material Studio and Quantum wise wise Atomistix Tool Kit (ATK),Virtual Nano Lab software's. Both experimental and computational results shows that LiMn2NiCuO4 belongs to Fd3m space group with lattice parameter approximately equal to 8.32A and volume of 563A $^3$. These capabilities establish first principle computation as fast-track tool in the design of $LiMn_2O_4$ electrode material at nano scale for Lithium ion battery. In purity and stability point of view nano $LiMn_{1.5}Ni_{0.25}Cu_{0.25}O_4$ synthesized by Co-precipitation method provided best structural and thermal properties as compared to microwave assisted solgel method and solution combustion method. $LiMn_{1.5}Ni_{0.25}Cu_{0.25}O_4$ shows very clear lattice image and electron diffraction pattern indicated that these samples maintained crystalline nature at high current density. $LiMn_{1.5}Ni_{0.25}Cu_{0.25}O_4$ sample has relatively smaller morphology including small particle size of 40nm and homogeneous particle distribution with similar particle shape This kind of morphology is very important to both the high specific capacity and good cyclability of the material[4-6]. Therefore nano $LiMn_{1.5}Ni_{0.25}Cu_{0.25}O_4$ should be most suited cathode material for LIB s used for renewable energy storage.

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# Automatic generation control of multi-source interconnected power system including DFIG wind turbine and FACTS devices

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*Abstract*—This paper presents the solution of automatic generation control (AGC) problem of four-area interconnected power system including DFIG (doubly fed induction generator) wind turbine using optimized sliding mode control (SMC) and combination of FACTS devices namely thyristor controlled series capacitor (TCSC) and superconducting magnetic energy storage (SMES). The hybrid disrupted oppositional based gravitational search algorithm (DOGSA) is used to tune the parameter values of SMC; TCSC-SMES along with gains of the speed and pitch angle controller of the DFIG wind turbine. The simulation results show the effectiveness of the proposed control scheme in comparison to GSA and OGSA tuned proportional integral derivative controller already reported in the literature in terms of faster convergence, settling time, overshoot and undershoot of the deviations in frequency and tie-line power. Further, the efficiency of the scheme is shown by varying the wind power from 10% to 40% in the considered power system followed by effect of large load perturbation from 0.1 p.u MW to 0.4 p.u MW in all the control areas of the power system.

*Keywords*— *automatic generation control; disruption operator; DFIG wind turbine; inertia control; pitch control; FACTS devices*

## I. INTRODUCTION

Due to random load variations in a power system, there is deviation in frequency and tie-line power of the control areas. The automatic generation control is required to control these deviations. In the most recent times, the integration of the wind power sources in the power system has gained a wider importance due to the consideration of the environmental impacts of the conventional generation sources [1]. The wind turbines do not provide frequency control when integrated in the power system due to their incapability to provide inertial support which is the issue of concern for the power engineers.

The different researchers have reported some methods such as inertia control, droop control and pitch control using which the frequency regulation can be provided by the DFIG wind turbines to the power system [2, 3]. The decoupling of the wind turbine inertia from the system by the power electronic converter results in more frequency deviations when load perturbation occurs in the power system. The authors in [4] proposed a method to enhance the inertia of the system using a secondary inertia loop in the system. The droop control is

based on the difference of measured and nominal frequency which is proportional to the power supplied by the wind turbine. The inertia and droop control of the wind turbine are addressed in [5, 6]. The blade pitch angle control is required in case of very low and high wind speed to maintain the optimal aerodynamic power. When wind speed is less than the cut-in speed, the pitch angle control maximizes the wind turbine output. On the contrary, when wind speed is more than the cut-out speed, the pitch controller limits the wind turbine output to its rated capacity [7, 8]. The proportional integral (PI) based pitch angle control is presented in [9] to assess the capability of the DFIG wind turbine, but the concern with these controllers is the optimal tuning of their parameter gains. The inertia and droop control using the optimal control methodology for two area system is reported in [10, 11]. The researchers in [12] proposed the gravitational search algorithm optimized speed and pitch angle controller for two-area thermal system including DFIG turbine. However, the diverse sources are not considered in the system. This paper presents the solution to frequency regulation problem of four-area interconnected power system with diverse power sources including DFIG wind turbine.

Many researchers have used different control techniques namely classical controllers such as integral, proportional integral, proportional integral derivative controller [14]; optimal and sub-optimal control [11]; artificial neural network [17] and fuzzy controllers [18] etc. The concerns with classical controllers are the tuning of their parameter gains and incapability to handle large size systems. The modern and adaptive control techniques pose the limitation of unsatisfactory performance in the presence of non-linearities such as generation rate constraint, governor deadband and time delay during signal processing in the power system [14]. A more robust sliding mode controller used in [19-23] possesses the features of order reduction and decoupled design process and hence, reduces the complexity of control logic in large dimension systems. The controller parameters of SMC have been tuned using genetic algorithm [19-21], particle swarm optimization [22] and teaching learning based optimization algorithm [23]. However, these algorithms sometimes get trapped in the local minima and have more computational time.

# Power Systems Protection Coordination and Associated Reliability with Smart Grid Security

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*Abstract-- In this paper, new Hierarchically Coordinated Protection (HCP) concept that mitigates and manages the effects of increased grid complexity on the protection of the power system is proposed. The concept is based on predicting protection circumstances in real-time, adapting protection actions to the power system's prevailing conditions, and executing corrective actions when an undesirable outcome of protection operation is verified. Depending on an application, HCP concept may utilize local and wide area measurements of the power system parameters, as well as non-power system data, such as meteorological, detection of lightning strikes, outage data and geographic information. Since HCP introduces intelligence, flexibility and self-correction in protection operation, it is well suited for the systems with increased penetration of renewables where legacy solutions may be prone to mis-operate. Such instances are unintended distance relay tripping for overloaded lines, insensitive anti-islanding scheme operation, and inability to mitigate cascading events, among other system conditions caused by renewable generation prevailing in future grids.*

*Keywords: HCP, point of common coupling (PCC), PSCAD/EMTDC, IEEE Bus system*

## I. INTRODUCTION

As there is in demand of energy increase and de-regulation of power Conventional structure grid with large few sources of generalized centralized sources of system transmission that will supply passive distribution of load in a system will be charge within the network based on energy renewal distribution system connected to all levels of voltage. In the past decade there was a significant due in electronics and control digital technology, as there were number of on and off shore wind generation units are setup in power transmission. At present time, system transmission structure has become more and more complex in operation and scenarios changes due to infrastructure grid up-gradation.

The planned system is operated with margins tighter, redundancy less, system reduced with internal faults, which was under dynamic exemplified grid operating based on phenomena of power and oscillation of voltages, as well related to frequency, voltage and instability angular. The dynamic behavior which is caused phenomena based on measurement of protection such as frequency, current, voltage, power etc. the changes which are measured on property which are deterated for protection and checking the leading performance and operation of misused.

There are various methods which are used for detecting, mitigation, preventing and event cascading which are available in the literature. The phenomena of cascading is considered as complex based on interactions and failures, it is very difficult to exhaustible the simulation possibilities and combination of failures in n-m power systems. Various researches have taken certain assumption in reducing the cascade outcome of failures [4]. Many researchers have made a study using the properties of statics based on system power network [5], others proposed some dynamic tree analysis method for evaluation[7], some used expert system method[8], some used recognition method based on patterns[9], the method which are studied are complex methods which are used in real time and are applicable in various applications base on risk and cascading outage which are used only in system stage only.

Installation of distribution system in various levels of network and transmission power between substation to the customers in an active and radial fashion with sources generation causing flow of bidirectional. The charges of selection and power disturbances will cause islanding unintentionally. Unregulated island and its behavior is not predictable in various types of frequency, voltage and other quality of parameters which are under unacceptable limits. The phase of reclosing is made possible and public safety in utility works is threatened. Thus the system of islanded would be promptly de-energized parameters at the point of common coupling (PCC) with the grid. Those measurements or some features extracted from the level of transmission and trip transfer will prevent the island network, low voltage and medium active level or islanding passive detection scheme will be utilized. The method of passive [15] will discriminate the island from normal condition which is based on the system measurement parameters and are joined in a common couple with grid of which are measured based on the extracted features.

# Very Low-Speed Sensor Less Online Torque Estimate Resistance of An Induction Engine Without Injection Signal

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**ABSTRACT:**

*Recently, further sensor less govern of ratiocination turbine drives accepted wonderful thinking to dodge the extraordinary problems correspond present boost sensors. However, low hurry exercises with durability vs framework variations remnants an area of the probe for sensor less systems. Stator battle owes allegiance all-out concern certainly surgery of boost sensor less systems in the low further locality. In this script, a sliding mode tide watcher for a ratiocination generator show. An assessment conclusion planted on this witness intently Popov's hyper-stability philosophy is scheduled to weigh the hurry and stator intransigence freely. The expected further onlooker with identical stator struggle passport gain verifiable by duplication. Experimental results are featured also to teach statement show of the recommended watcher and appraisal data at very low and zero furthers.*

*Keywords: Induction motor, speed sensor less, zero-speed control.*

## I. INTRODUCTION:

A company of sensorless introduction transformer drives has been doing one's thing way back when. However, the dance of the above-mentioned sensorless drives is not satisfactory when as to the censored ones. A principal impediment of the particular drives occurs the predicament of command at low stator frequencies. During this region of the trip, the signal-to-noise proportion of the stator river is decreased fairly and the action of the stator intransigence potential drop is not imperceptible. Another struggle undergoes provide the durability of the drives counter to transformer restriction variations, specifically rotor battle. Also, it is famed that synchronic appraisal of hurry and rotor struggle is somewhat obtained in the line govern greetings diesel drives with continuous rotor flux. To iron out the particular problems, we point a different further sensor less scenario planted on a feed leading turn to administer routine [6]. The govern strategy has some original looks related with the classical line commands. First, the rotor flux seizes as a sinusoidal waveform in the d, q framework on the outside arousing affect the force command drama. It is viable to count hooked up

both quicken and rotor protection accepting the rotor flux. Second, it does not have any river evaluation loops. Thus, we do not need to think any development compensations in behalf of the stator potentials and stator floods. Since rule potential perchance tenacious employing this feed dispatch skill, we can eliminate difficult processes to counterbalance form PI gains in river regulators. Third, the electromagnetic armband is administered promptly and freely of the rotor flux past inducing any pin stream. Since we do not vaccinate any low-frequency signals to evaluate the rotor protection, we think fewer tide ripples and we do not need to devise a high band-pass penetrate to dismiss them. Hence, we can cut down the weigh down of plumbing to install medium frequency signals and also groupware to find the particular very low-frequency signals. In this essay, the feed address type turn governs upset described intensely practicing the engine identical lap equations. Then, the appraisal equations for rotor further and rotor intransigence rise from Stator Rivers in the d, q framework. After that, the quicken sensor less practice situated on the feed address collar manage is described. Finally, about sundry copy results

Academic Science

# Application of Power Electronic Devices in Soft Starting of a DC Motor

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**ABSTRACT:**

*The starting of electric motors is very important aspect in regards to their life. Whenever the supply is given to DC shunt motor it starts to rotate, so during initial stage of starting it will draw more amount of current which is called starting current. This starting current is about six to seven times the rated current under no load condition, it may be even higher when motor starts under loaded condition, so limiting of these high starting current is essential. Due to this high starting current insulation of motor will get damaged and sometimes this current may burn the winding of the machine too. The limiting of these high starting current of DC motor is conventionally done by using starters. For that different types of starters are used depending upon the type of DC motor. In this paper, soft starting of DC motor by using SCR Module and this is an experimentally proved in laboratory. This SCR Module consist of a rectifier which is designed with two thyristor[3], two diodes and firing circuit[5]. From this rectifier a smooth variable DC output voltage is obtained. By applying this DC output voltage to armature terminals of DC motor, smooth starting is achieved with reduced starting currents. Along with this rectifier SCR Module consist one more diode rectifier, which is used to excite field winding of DC shunt motor. Comparing with three point starter, starting DC motor with SCR module gave still lower starting current. The limiting factor is improved from 40% to 90 % with new designed soft starter using SCR Module.*

**KEYWORDS: Dc Motor, Thyristors, Diodes, Capacitors, Resistors, Relay, Transformers, Regulator, On/Off Switch, Heat Sink, Firing Circuit, Three-Point Starter.**

## 1. INTRODUCTION:

The main aim of this paper is to minimize starting current of DC motor with smooth starting [1]. This can be achieved with the help of SCR module. Nowadays to start the DC motors we are using different types of starters. They are i. two point starter ii. three point starter iii. four point starter from the above three starters any one of starter can be used depending on type DC motor and application.

When the motor is at rest the speed of the motor is zero therefore back Emf $E_b$ is zero and if the DC motor is connected directly to supply mains a heavy current[2] will flow through the armature conductors because from the Emf equation

for armature circuit,

$$E_b = (V - I_a R_a) \quad \text{--------- (1)}$$

$$I_a = (V - E_b)/R_a \quad \text{--------- (2)}$$

For 220v, 5HP DC Shunt motor, armature resistance, $R_a = 1.67$ if switched directly on to the supply, it would draw a current of $I_a = (220-0)/1.67 = 131.74A$ from equation (2)

While the full load current would probably be about 20A. when motor starts running back emf $E_b$ will develop and these current will decreases to a much smaller.

But at the instant of starting these heavy inrush of current may cause,

1. Heavy sparking at the commutator and even flash overs.
2. Damage to the armature winding: either by the heat developed in the windings, or by the mechanical forces set up by electromagnetic action.
3. Damage to the rotating parts of the motor
4. Due to load development of large starting torque and quick acceleration.
5. Large dip in the supply voltages.

# Preparation, Deposition and Characterization of Solution Precursor

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**Abstract:**

The Solution Precursor Plasma Spray (SPPS) process has been used for Thermal Barrier Coatings (TBCs). In this work Zirconyle nitrate is used as solution precursor. It has prepared in house for plasma spray. The prepared solution has successfully deposited on the substrate by SPPS process. The deposited coatings were characterized by scanning electron microscope (SEM) and X-ray diffraction (XRD).

Keywords---Solution precursor, Plasma Spray, TBCs, SEM, XRD

## Introduction:

The thermal spray processes have been using the different kind of powder feed stocks such as for the coating. It has been widely used for various purposes like to protect from corrosion, improve durability and oxidation resistance properties at high temperature and it can reduce the metal service temperature [1-2]. The Solution Precursor Plasma Spray (SPPS) is recently developed for the fine spray. It is same as the existing conventional spraying processes with the only difference that instead of powders the feed is in the form of solution precursor. The liquid solution precursor material is injected into the plasma jet by a nozzle. Rapid heat-up and vaporization of precursor droplets in the formation of particles, which will be heated and accelerated to the substrate to generate coatings. In order to gain a better quality and performance of the coating, liquid precursors are sprayed into the plasma jet to generate finely structured coatings [3]. Deposition of small, melted particles leads to fine microstructure with the improvement in certain mechanical properties like hardness and strength. The different kinds of solutions or suspension precursors have been used for the different purposes. With normal APS process it is not possible to feed powder with size finer than due to the effects of surface forces on powder flow [4]. Important thing to be noted that the SPPS coating has lower conductivity than EB-PVD coatings but in the upper range found in APS coatings. Mechanical properties of SPPS coatings like fracture toughness and hardness are measured to be higher than APS coatings. Both in plane and out of plane compressive strength for SPPS are lower than the APS but in plane elastic modulus is higher and out of plane is lower for SPPS than APS [5]. In general, SPPS coatings have a very fine grain structure [6]. Compared to conventional materials the Nano grained deposits and Nano sized particles have superior properties [7]. Thermal spraying can also use in the Automobile Industry [8]. The preliminary investigations have been carried out about the effects of processing parameters in the SPPS and to understand their implications and improving of this process.

## Experimental setup:

### Preparation of Solution Precursor:

In the preparation of zirconyl Nitrate the following process has been carried out. The 20 gm of Zirconium Oxide ($ZrO_2$) and 80 gm. of Potassium bisulphate ($KHSO_4$) are mixed together in a crucible. This mixed material is heated at the temperature of $600^0C$ in muffle furnace about 15 minutes then the mixed powder is formed as a solid. After

# Optimization of TIG welding Parameters by Taguchi Method for Brass 3019

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**Abstract -** Brass materials are generally utilized as designing materials in the business as a result of their high quality, high erosion obstruction, and high electrical and warm conductivity. They are effectively molded and they have a lovely appearance. Be that as it may, it is hard to weld brasses. The fundamental issue with these composites in welding is the dissipation of zinc amid the welding procedure. In the wake of welding, the weld metal winds up permeable. In addition, since the measure of zinc in the compound is lessened because of dissipation, the metal material loses the physical and synthetic properties which it typically has. Concentrates on weldability of metal materials are not very many. There is almost no data concerning the weldability of metal materials in the writing and general definitions are frequently observed. It is difficult to discover considers on test examinations of the welding of metal materials separated for a couple of exemptions. There are for all intents and purposes no investigations to help exploratory information about in the case of welding of metal materials are conceivable. In our analysis, the impact of TIG welding parameters on mechanical properties of brass3019 (70%Cu– 30%Zn) joints is researched. So as to look at the mechanical properties hardness test, the elasticity of the welds was estimated. The fundamental parameters in this examination were the root hole, stream rate, width of anode and stream of current. Furthermore, upgrading this work for various parameters Taguchi technique is utilized.

Keywords: TIG welding; Brass; Root gap; Flow rate; Taguchi

## 1. INTRODUCTION

Metal is a compound of copper and zinc and has yellow shading, like the presence of gold. This metal can have fluctuating extents of zinc and copper, which creates an expansive scope of sorts with various properties. Metal is generally utilized for ornamental apparatuses in light of its brilliant gold appearance [1]. It is additionally utilized for pipes valves, course, locks, and melodic instruments. There are three regular types of metal [2].

Metal is the name used to portray a copper amalgam, which has certain zinc content. Copper is one of the metals that were first ready to be worked by people, as it softens at a temperature of around 1,080°C and is anything but difficult to work because of its low hardness [3]. Zinc has an even lower dissolving point (420°C) and can frame blended precious stones with copper. By consolidating copper with zinc, a composite is shaped, which is harder than copper, yet has great working properties [4].

## 2. METHODOLOGY

People have been utilizing metal for around 5,000 years. This material, accordingly, one of the most established combinations there is. The main special case is bronze, which has been utilized for over 6,000 years [5]. Bronze is additionally a copper combination; be that as it may, it contains the overwhelming metal tin rather than zinc. It was dependably a prominent material as this compound creates exceptionally alluring shading subtleties if the zinc portion is changed [6].

Now, it is noticed that it is beyond the realm of imagination to expect to appraise the zinc division by translating the shading, as present day metal compounds contain other alloying components, which from one perspective influence its hardness and erosion obstruction, however then again likewise influence its shading. Aluminum, press, manganese, nickel, and silicon are most oftentimes included as combinations, as that metal can be adjusted to the present day needs of industry [7].

## 3. RESULTS AND DISCUSSION

Notwithstanding its high copper content, it isn't destructive. An incredible inverse, copper-zinc composite have a bactericidal impact and keep the colonization of microscopic organisms. Hence, metal entryway handles are helpful fittings, for instance, out in the open structures, and in broad daylight transport. Not at all like steel composites, can't metal be solidified by warming [8]. Metal must be strain or work-solidified. The solidifying happens when the material is worked mechanically, e.g. by chilly working. The activity of power does not solidify metal. Current amalgams contain basically no air or slag and consequently, can't be solidified. The hardness is created rather by stressing (extending) the metal microstructure. The burdens delivered amid working influence the hardness of the material [9].
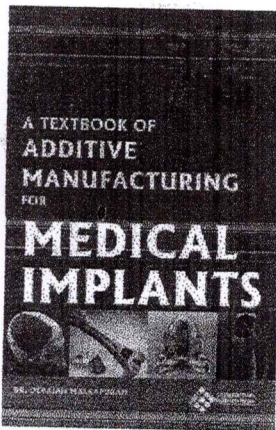
# Published Books

## A Textbook Book of Additive Manufacturing for Medical Implants

Authors : A Textbook Book of Additive Manufacturing for Medical Implants

ISBN : 9789387631076

Published Date : 2018-02-2 11:11:51

Pages : 155

Original Price : 795

Publisher : SciMedtech

## About the Book

This book is intended for an undergraduate and post graduate student who has interest to produce medical implants by doing research for need of society. This book gives details of medical implants and how it can be prepared by using additive manufacturing technique.

## About the Author

Dr. Malkapuram Devaiah completed Bachelor of Engineering from CBIT, Gandipet in 1997, M.Tech, from NIT Warangal in 2000 and PhD from Osmania University in 2013.

Prof. Dr. Malkapuram Devaiah has 17+ Years teaching experience and published national and international journals.

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ICMPC 2017

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

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## Abstract

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

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

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

## 1. Introduction

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

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# Exploration of Laser Jet Welding by Using CFD

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**Abstract:** Since low aspect ratio welds can be made with Conduction mode welding, it is used in thin sheet welding. The weld geometry and microstructure depend on the temperature distribution and the cooling rates. Experimental determination of temperatures in the work-piece through the use of thermocouples, can provide data for a limited number of points and is time consuming and expensive. Numerical modeling of heat transfer and fluid flow in laser beam welding can provide previously unavailable information about the temperature distribution and thermal cycles at all points in the computational domain in a relatively short time and at low cost. A critical review of the available literature indicates the following problems with the numerical models of conduction mode welding. (1) There is no comprehensive three-dimensional model of conduction mode laser beam welding (LBW) available in literature (coded). (2) While models of conduction mode laser beam welding (LBW) have been proposed, very few has been tested for the welding of various materials with thin plates. The goal of this dissertation is to address these important issues.

In this dissertation, a comprehensive two-dimensional heat transfer model based on energy conservation equations is solved to study the shape of weld pool. Weld thermal cycle and weld pool geometry considering fluid flow for laser spot welding of mild steel for two dimensional, turbulent and transient models based on mass, momentum and energy equations is modeled to study temperature and velocity fields along with weld pool. A moving Gaussian heat source is considered as laser beam. To make model computationally efficient half of the geometry is modeled. In case of welding with fluid flow surface tension and gravity forces are considered for the calculation of transient weld pool convection. A finite volume scheme with fixed time stepping is used for the calculations. The observed weld pool dimension is compared for different beam power and beam radius applied as heat source. The behavior of the mushy zone, i.e., the solid-liquid two phase region, during heating and cooling is studied. Results show information about the weld pool shape, maximum temperature and velocity vectors. This data is useful for determining the solidification morphology and the scale of the solidification sub structure.

**Key words:** laser beam welding, weld pool shape, maximum temperature, velocity vectors, etc.

## I.INTRODUCTION

Laser welding has become a significant industrial process because there are many outstanding advantages in using laser welding over other widely used bonding technologies. As an alternative to the common adhesives or solders used for the joining process, laser welding offers a number of attractive features such as high weld strength to weld size ratio, reliability, and minimal heat-affected zone. These provide the benefits of low heat distortion, a noncontact process, repeatability, ability to automate, and high throughput. For these reasons, the applications of laser beam welding have broadened in the past decades.

Here laser welding is carried out on small thickness where the thickness of plates is in microns which need a small heat affected zone. Lasers are well suited for welding with small length scale because they can deliver a controlled amount of energy to very small components with a high degree of precision. Laser welding is generally carried out in two modes; conduction mode welding and keyhole mode welding. In keyhole mode of welding the material is heat above its vaporization temperature forming plasma leading to deeper weld pools and hence are used with thick plates. In conduction mode welding, the material is heated below its vaporization temperature leading to small weld depths. Conduction mode is mostly preferred in micro-welds due so as to keep weld free of contamination and blow holes caused during solidification of the material.

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# D.El.Ed
## Second Year, Paper - VI

# Pedagogy of English Language Education

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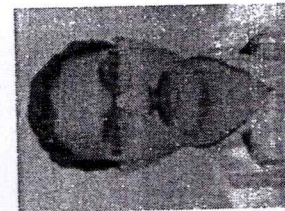Osmania University
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## Telugu Akademi
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Ferroelectric Glass Ceramics

The techniques used for shaping conventional ceramics such as extrusion, jollying or slip casting are slower than glass shaping methods. In addition the ceramic ware usually requires extended drying and firing periods to avoid cracking. Unfired conventional ceramics are fragile. With conventional ceramics relatively large shrinkage (40 to 50 % by volume) occur during the drying and firing operations and these dimensional changes may be accompanied by distortion. Consequently, the control of final dimensions is more difficult for ceramics. The glass-ceramic route, on the other hand offers the possibility of fabricating PT without cracking. Controlled crystallization in glasses has led to the development of glass ceramic materials with a pore-free, fine-grained microstructure. Specific properties such as high mechanical strength and low thermal expansion can also be tailored. The advantages of glass ceramic processing over the traditional ceramic processing include ease of forming complicated shapes, uniformity and reproducibility of properties.
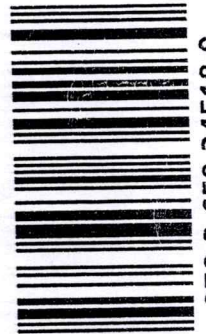
Jakkula

Dr Shankar Jakkula obtained Masters degree in Engineering Physics from National Institute of Technology Warangal in the year 2002. He earned the doctorate degree from Visvesvaray National Institute of Technology, Nagpur. He had published 10 research papers in peer reviewed international journals. He has a total teaching experience of 15 years.