ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
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Bathinda-151001 (Punjab), India

ANNUAL REPORT

2017

RESEARCH PUBLICATIONS

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
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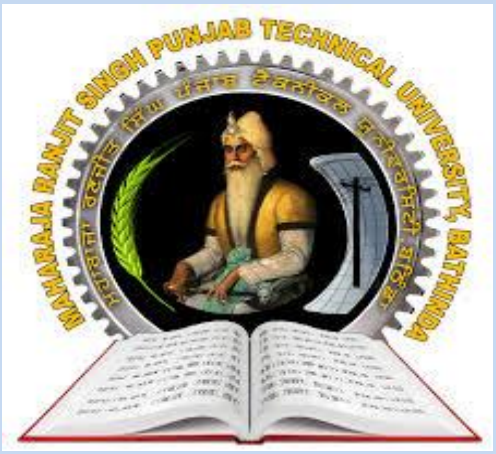
ANNUAL REPORT- RESEARCH PUBLICATIONS



2017

INTERNAL QUALITY ASSURANCE CELL
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
BATHINDA 151001

ANNUAL REPORT- RESEARCH PUBLICATIONS [2017]

Prepared by:

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INTERNAL QUALITY ASSURANCE CELL

ANNUAL REPORT- RESEARCH PUBLICATIONS

2017

RESEARCH PUBLICATIONS [2017]		
Department of Pharmaceutical Sciences & Technology		
S.NO.	**Research Papers**	**Impact Factor**
1	Alagdar GSA, Oo MK, Sengupta P, Mandal UK, Jaffri JM, Chatterjee B (2017) Development of a binary carrier system consisting polyethylene glycol 4000-ethyl cellulose for ibuprofen solid dispersion. *International Journal of Pharmaceutical Investigation,* 7, 142.	UGC listed
2	Bappaditya C, Amalina N, Sengupta P, Mandal UK (2017) Mucoadhesive polymers and their mode of action: A recent update. *Journal of Applied Pharmaceutical Science* 7, 195-203.	UGC listed
3	Baldi, A (2017) Probiotics for health benefits: the regulatory concerns and suggestive roadmap *Biomedical Journal of Scientific & Technical Research*, 1, 1230-1231.	UGC listed
4	Alam N, Koul M, Mintoo MJ, Mondhe DM, Gupta PN (2017) Development and characterization of hyaluronic acid modified PLGA based nanoparticles for improved efficacy of cisplatin in solid tumor. *Biomedicine & Pharmacotherapy* ,95, 856-864.	9.3
5	Singh G, Gupta N, Gupta V, Ishar MPS (2017) Reduction of chromano–piperidine-fused isoxazolidines: Tandem intramolecular rearrangements leading to 2-(methylamino)-4- oxo-N-phenyl-N-propyl-4H-chromene-3-carboxamide. *Tetrahedron Letters* 58,2456-2459.	4.3
6	Win T, Rajagopal J, Manda UK, Sengupta Z, Chatterjee B (2017) Incorporation of carbopol to palm olein based analgesic cream: Effect on formulation characteristics. *Latin American Journal of Pharmacy* 36, 2144-2152	0.5
7	Chatterjee B, Amalina N, Sengupta P, Mandal UK(2017) Mucoadhesive polymers and their mode of action: A recent update. *Journal of Applied Pharmaceutical Science* 7, 195-203	2.0
Department of Computational Science		
8	Kumar M, Sharma RK, Jindal MK (2017) Offline handwritten gurmukhi character recognition: Analytical study of different transformations. *Proceedings of the National Academy of Sciences,* 87, 137-143.	0.767
9	Kumar M, Jindal MK, Sharma RK (2017) A novel technique for line segmentation in offline handwritten gurmukhi script documents. *National Academy Science Letters*, 40, 273.	0.788
10	Kumar M, Jindal SR (2017) Devanagari handwritten grading system based on curvature features. *Computer Modeling in Engineering & Sciences*, 113, 195-202.	1.253
11	Gupta S, Singh YJ, Kumar M (2017) Object detection using multiple shape based features. *Conference Paper Fourth International Conference on Parallel, Distributed and Grid Computing*, 433-437.	1.544
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12	Goyal L, Chawla V, Hundal JS (2017) Elevated temperature corrosion studies of AICrN and TIAIN coatings by PAPVD on T91 boiler steel. *Journal of Materials Engineering and Performance,* 26, 5481-5494.	1.819
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15	Sharma V, Gupta G, Singh S (2017) Review of metal contamination in ground water in different states of India. *International Journal of Latest Technology in Engineering, Management and Applied Science,* 6, 224-226.	5.471
16	Gupta G, Sharma V (2017) Five-year study of particulate matter during Diwali in Amritsar, Punjab. *International Journal of Advance Research in Science and Engineering,* 6, 1149-1152.	1.142
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	University Business School	
25	Singh P (2017) An empirical analysis of relationship in stock market development and economic growth: An Indian context. *International Journal of Economic Research,* 14, 1-14.	UGC listed
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	Department of Mechanical Engineering	
37	Chohan JS, Singh R, Boparai KS, Penna R, Fratenali, F. (2017) Dimensional accuracy analysis of coupled fused deposition modeling and vapour smoothing operations for biomedical applications. *Composites Part B: Engineering*,117, 138-149.	9.07
38	Garg HK, Singh R (2017) Investigations for obtaining desired strength of nylon6 and Fe powder-based composite wire for FDM feedstock filament. *Progress in Additive Manufacturing* 2, 73-83.	UGC Care
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DEPARTMENT OF PHARMACEUTICAL SCIENCES AND TECHNOLOGY

Sr. No. 1

› Int J Pharm Investig. Jul-Sep 2017;7(3):142-148. doi: 10.4103/jphi.JPHI_54_17.

Development of a binary carrier system consisting polyethylene glycol 4000 - ethyl cellulose for ibuprofen solid dispersion

Gada Sulaiman A Alagdar [1], May Kyaw Oo [1], Pinaki Sengupta [2], Uttam Kumar Mandal [3], Julian Md Jaffri [1], Bappaditya Chatterjee [1]

Affiliations + expand

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Erratum in

Erratum: Development of a binary carrier system consisting polyethylene glycol 4000 - ethyl cellulose for ibuprofen solid dispersion.

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PMID: 29692433 Free PMC article.

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Mucoadhesive Polymers and Their Mode of Action: A Recent Update

Bappaditya Chatterjee[1*], Nursazreen Amalina[1], Pinaki Sengupta[1], Uttam Kumar Mandal[2]

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ABSTRACT

The potential of mucoadhesive delivery system for sustained delivery of drug has been established few decades back. Different polymeric systems such as single or combined, substituted, conjugated, pre-activated polymer (s) etc. are used to develop such delivery platform. To explain the mucoadhesion mechanism, several possible theories namely electronic theory, adsorption theory, wetting theory, diffusion theory, fraction theory and mechanical theory have been proposed. But none of these theories alone can explain the mechanism of mucoadhesion. Various mechanisms of mucoadhesion or bioadhesion between polymer and mucin such as H bonding, electrostatic interactions, di-sulfide linkage, van Der Waals attraction etc have been evidenced. Researches are focused to enrich such interaction between the mucous layer and the delivery platform by modifying the system. Wide varieties of polymers such as cationic, anionic, non-ionic, thiolated polymers etc have been used to design and develop mucoadhesive drug delivery system. Therefore reviewing and analyzing the mucoadhesive polymeric system and their mechanism of action is still relevant and necessary. The aim of this current review is to highlight the polymers which are being used under recent scientific researches with emphasis on their mechanism of mucoadhesion. The result of this critique will assist researchers to screen the mucoadhesive polymers for their designated purpose.

INTRODUCTION

Mucoadhesive formulation contains one or more hydrophilic polymers along with drug. When it comes in contact

2013). The success of MDDS depends on the ability of the polymer/s to retain at the mucous layer and to sustain the drug release.

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Mini Review | Open Access

Probiotics for Health Benefits: The Regulatory Concerns and Suggestive Roadmap

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Abstract

Probiotics, the friendly bugs, has gained impressive attention worldwide due to their nutraceutical and pharmaceutical benefits, established in recent years. However existing regulatory regime in various countries has ambiguities regarding its classification based on intended use and respective approval process. Author and his coworkers have proposed a revised definition and categorization of probiotic products along with possible path to develop a comprehensive guideline for global enactment.

Keywords: Food; Dietary supplements; Health claims; Nutraceuticals; Probiotics; Pharmaceuticals; Regulatory guidelines.

Introduction

Probiotics, as defined by FAO/WHO, are live microorganisms, which when administered in adequate amounts confer a health benefit on the host. In recent days, use of probiotics for health benefits has increased due to their wide range of medicinal values complemented with low cost and insignificant side effects. This has resulted in commercial exploration of probiotics globally for nutraceutical and pharmaceutical applications. The major driving force behind the success of these products is growing interest in the concept of holistic health through diet regulation as preventive step to avoid various diseases. In last two decades, probiotics are also reported to be useful in treatment of some serious clinical disorders such as cancer, diabetes, cardiovascular diseases, bacterial vaginosis, urinary tract infections, allergic diseases (atopic dermatitis, allergic rhinitis) and prevention of dental caries, respiratory infections, lactose intolerance, variety of in 2018 attributed to food, beverage, dietary supplements and pharmaceuticals.

Current Status of Probiotics

Despite of tremendous growth in the probiotic market across the globe, till date, their development, regulatory aspects, legislative issues and technological obstacles are complex, risky and expensive enough. Regulatory agencies of different countries are regulating them under variety of categories viz. dietary supplements, natural health products, medical foods, functional foods, drugs etc. as per their intended use. However there is no clear cut demarcation of probiotic based pharmaceutical and food products. Therefore an urgent attention is needed for effective regulation and approval process of these products with established scientific evidences for their therapeutic and nutritional claims.

S.no 4

Development and characterization of hyaluronic acid modified PLGA based nanoparticles for improved efficacy of cisplatin in solid tumor

Noor Alam [a], Mytre Koul [b], Mubashir J. Mintoo [b, c], Vaibhav Khare [a], Rahul Gupta [a], Neha Rawat [d], Parduman Raj Sharma [b], Shashank K. Singh [b, c], Dilip M. Mondhe [b, c], Prem N. Gupta [a, c]

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Abstract

Cisplatin is a potent and widely used chemotherapeutic agent to treat a variety of tumors. However, its clinical use is associated with undesirable side effects and acquired resistance to cisplatin. In this study, cisplatin loaded hyaluronic acid (HA) functionalized poly (lactic-co-glycolic acid)–poly (ethylene glycol) nanoparticles (CP-HA-PLGA-PEG-NPs) were fabricated using double emulsion solvent evaporation method to target CD44 receptor expressed on cancerous cells. The developed nanoconstructs were characterized for various *in vitro* parameters, including size distribution, zeta potential, morphology, drug loading and *in vitro* release. The HA content on the HA-PLGA-PEG-NPs was quantified by a turbidimetric method. The *in vitro* anticancer study in human ovarian cancer (SKOV-3) cells showed significantly ($p < 0.05$) higher cytotoxicity of CP-HA-PLGA-PEG NPs as compared to free cisplatin and non-targeted nanoparticles (CP-PLGA-PEG NPs). Further, laser scanning confocal microscopy revealed that there was enhanced cellular uptake of HA-PLGA-PEG NPs in CD44-over expressing ovarian cancer cell line (SKOV-3). The *in vivo* antitumor activity of CP-HA-PLGA-PEG-NPs was significantly ($p < 0.05$) higher than free cisplatin and CP-PLGA-PEG-NPs in Ehrlich tumor (solid) bearing mice. The results demonstrated the potential of target specific nanoconstruct of cisplatin in the improved cancer chemotherapy.

S.no 5

Tetrahedron Letters • Volume 58, Issue 25, Pages 2456 - 2459 • 2017

Reduction of chromano–piperidine-fused isoxazolidines: Tandem intramolecular rearrangements leading to 2-(methylamino)-4-oxo-N-phenyl-N-propyl-4H-chromene-3-carboxamide

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Abstract

Reductive ring opening of isoxazolidine moiety of chromano–piperidine-fused isoxazolidines (3a–c) with $HCOONH_4$ and 10% Pd/C in a mixture of solvents (THF/MeOH) at ambient temperature, affords novel 2-(methylamino)-4-oxo-N-phenyl-N-propyl-4H-chromene-3-carboxamide (4), which is apparently derived from reductive N[sbnd]O bond cleavage followed by tandem intramolecular rearrangements. Plausible mechanistic rationale for the formation of compound 4 is proffered. © 2017 Elsevier Ltd

S.no 6

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Incorporation of Carbopol to Palm Olein Based Analgesic Cream: Effect on Formulation Characteristics

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***SUMMARY*. The purpose of the investigation was to incorporate carbopol gel with palm olein based emulsion and to investigate the effect of such incorporation on formulation characteristics. A palm olein based emulsion was formulated followed by addition of carbopol 940 to it. The critical parameters of incorporating carbopol in bench scale level were checked. The developed palm olein-carbopol based analgesic cream was analyzed for pH, zeta potential, viscosity, rheological property and forced centrifugation.Incorporation of 0.3% of carbopol gel (1% w/w) helps to maintain the viscosity and stability. pH and zeta potential of palm olein-carbopol combined cream was within range of 6.90 to 7.20 and -23.1 to -74.9, respectively. Combination of palm olein based emulsion and carbopol would be a suitable option for topical cream formulation. The pH of carbopol gel and method of mixing with the palm olein based emulsion had crucial effects on phase separation of the product.**

RESUMEN. El propósito de la investigación fue incorporar gel de carbopol a una emulsión basada en oleína de palma e investigar el efecto de tal incorporación sobre las características de la formulación. Se formuló una emulsión basada en oleína de palma seguida por la adición de carbopol 940 a la misma. Se verificaron los parámetros críticos de la incorporación de carbopol en el nivel de escala de banco. Se analizó el pH, el potencial zeta, la viscosidad, lsa propiedades reológicas y la centrifugación forzada de la crema analgésica desarrollada a base de carbamato de palma. La incorporación de 0,3% de carbopol gel (1% p/p) ayuda a mantener la viscosidad y la estabilidad. El pH y el potencial zeta de la crema combinada oleína de palma-carbopol estaban dentro del intervalo de 6,90 a 7,20 y de -23,1 a -74,9, respectivamente. La combinación de emulsión basada en oleína de palma y carbopol sería una opción adecuada para la formulación de crema tópica. El pH del gel de carbopol y el método de mezcla con la emulsión a base de oleina de palma tuvieron efectos cruciales sobre la separación de fases del

S.no 7

Mucoadhesive Polymers and Their Mode of Action: A Recent Update

Bappaditya Chatterjee[1*], Nursazreen Amalina[1], Pinaki Sengupta[1], Uttam Kumar Mandal[2]

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Mucoadhesive drug delivery system, Bioadhesion, Sustained delivery, Polymers, Mucoadhesison mechanism

ABSTRACT

The potential of mucoadhesive delivery system for sustained delivery of drug has been established few decades back. Different polymeric systems such as single or combined, substituted, conjugated, pre-activated polymer (s) etc. are used to develop such delivery platform. To explain the mucoadhesion mechanism, several possible theories namely electronic theory, adsorption theory, wetting theory, diffusion theory, fraction theory and mechanical theory have been proposed. But none of these theories alone can explain the mechanism of mucoadhesion. Various mechanisms of mucoadhesion or bioadhesion between polymer and mucin such as H bonding, electrostatic interactions, di-sulfide linkage, van Der Waals attraction etc have been evidenced. Researches are focused to enrich such interaction between the mucous layer and the delivery platform by modifying the system. Wide varieties of polymers such as cationic, anionic, non-ionic, thiolated polymers etc have been used to design and develop mucoadhesive drug delivery system. Therefore reviewing and analyzing the mucoadhesive polymeric system and their mechanism of action is still relevant and necessary. The aim of this current review is to highlight the polymers which are being used under recent scientific researches with emphasis on their mechanism of mucoadhesion. The result of this critique will assist researchers to screen the mucoadhesive polymers for their designated purpose.

DEPARTMENT OF COMPUTATIONAL SCIENCE

Sr. No. 8

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RESEARCH ARTICLE

Offline Handwritten Gurmukhi Character Recognition: Analytical Study of Different Transformations

Munish Kumar[1] · M. K. Jindal[2] · R. K. Sharma[3]

Received: 6 March 2015 / Revised: 30 May 2016 / Accepted: 6 July 2016

Abstract In this paper, we have presented an offline handwritten *Gurmukhi* character recognition system using various transformations techniques, namely, discrete wavelet transformations (DWT2), discrete cosine transformations (DCT2), fast Fourier transformations and fan beam transformations. DWT2 has also been considered with three different types, namely, Haar wavelet, Daubechies (db) 1 wavelet and Daubechies (db) 2 wavelet transformations. In this work, we have used support vector machine (SVM) classifier for classification, as well as for linear kernel and polynomial kernel. For the purpose of training and testing data set, we have collected around 10,500 samples of isolated offline handwritten Gurmukhi characters. After due experiments with the help of 5-fold cross validation technique using DCT2 coefficients as

1 Introduction

Document analysis and recognition (DAR) systems play a major role in data transfer between human beings and computers. Optical character recognition (OCR) is an essential part of a document analysis and recognition system. Research work in the field of OCR has been going on continually throughout the world since late sixties. It is an active area of research even these days as the problem involved is complex in nature. The process of character recognition is divided into two parts, namely, printed character recognition and handwritten character recognition. As far as Indian scripts are concerned, few solutions have been presented for printed character recognition, but no solution has been offered for handwritten character

Sr. No. 9

Natl. Acad. Sci. Lett. (July–August 2017) 40(4):273–277
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SHORT COMMUNICATION

A Novel Technique for Line Segmentation in Offline Handwritten Gurmukhi Script Documents

Munish Kumar[1] · M. K. Jindal[2] · R. K. Sharma[3]

Received: 10 July 2015 / Revised: 6 March 2016 / Accepted: 30 June 2017 / Published online: 19 August 2017

Abstract Segmentation is an important step in Offline Handwritten Character Recognition (Offline HCR). Line segmentation is an important activity included in segmentation process. Line segmentation is a challenging task and it becomes even more challenging when one needs to segment lines in a skewed offline handwritten document. Improper segmentation decreases the recognition accuracy considerably. In this paper, strip based projection profile technique and smearing technique with contour tracing (proposed combination) have been used for line segmentation in offline handwritten Gurmukhi script documents. We have achieved an accuracy of 98.26% for line segmentation with proposed technique and an accuracy of 93.05% for line segmentation with strip based projection profile technique.

Introduction

Offline Handwritten Character Recognition (Offline HCR) bridges the gap between man and machine by providing a faster interaction method. It involves activities like digitization, pre-processing, segmentation, feature extraction, classification and recognition. Segmentation is the most critical step for document recognition. Segmentation of a handwritten document into lines is one of the most important and challenging tasks in an offline handwriting recognition system. For the task of segmentation, an algorithm is used for finding segmentation points in handwritten document. The challenge of a segmentation technique lies in deciding best segmentation points. Incorrect line segmentation can lead to incorrect recogni-

Sr. No. 10

Vol.113, No.2, 2017, pp.195-202, doi:10.3970/cmes.2017.113.201 OPEN ACCESS ARTICLE

Devanagari Handwriting Grading System Based on Curvature Features

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Abstract

Grading of writers in perspective of their handwriting is a challenging task owing to various writing styles of different individuals. This paper presents a framework for grading of Devanagari writers in perspective of their handwriting. This framework of grading can be useful in conducting the handwriting competitions and then deciding the winners on the basis of an automated process. Selecting the set of features is a challenging task for implementing a handwriting grading system of particular language. In this paper, curvature features, namely, parabola curve fitting and power curve fitting have been considered for extracting the vital information of writers, which can be helpful in grading the writers. For obtaining the classification score, k-NN classifier has been considered in the present work. Four printed Devanagari font styles, namely, Devlys, Krishna, Krutidev, and Utsaah have been considered for train the proposed model of handwriting evaluation. For evaluating the effectiveness of the proposed framework, we have conducted a mock test of 75 Devanagari writers (Left handed and Right handed) and noticed that the proposed framework performing well suitable for conducting the handwriting competition of Devanagari text writers. This work is also newly in the ground of Devanagari text recognition.

Sr. No. 11

2016 Fourth International Conference on Parallel, Distributed and Grid Computing (PDGC)

Object Detection using Multiple Shape-Based Features

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***Abstract*- The study proposed a method of object recognition using different shape-based geometrical features and partitioning strategies of input images.The system extracted meaningful features of an object. Several features such as sub-window, diagonal, non-connected, connected, and chord features etc are extracted for recognition. These features help in detecting the shape of an object further which helps in recognizing the object. The study also adopts different five partitioning strategies for sampling the input images. The image classification is performed using Linear-SVM and *k*-NN classifiers. The study used 1020 images (total 51 objects contain 20 images of each object) for the purpose of training and testing. The uses of different features and partitioning**

II. RELATED WORK

Object detection system typically includes Hough transformation [1], pyramid matching [3], hierarchical shape representations [7-9], shape contexts [2, 10], pictorial structures [4], codebook approaches [5, 6] and zoning based features [11]. In shape context each point is associated with descriptor and remaining points are described relative to the shape [10]. Partition the edges of the image for object model into clusters of adjacent contour segments and for matching these objects, they detect paths through the contour segments which are similar to the outline of the modeled categories [12]. A shape codebook is used for the purpose. Normally a

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Elevated Temperature Corrosion Studies of AlCrN and TiAlN Coatings by PAPVD on T91 Boiler Steel

Lucky Goyal, Vikas Chawla, and Jasbir Singh Hundal

(Submitted October 26, 2016; in revised form August 2, 2017; published online October 2, 2017)

The present investigation discusses the hot corrosion behavior of AlCrN and TiAlN nano-coatings on T91 boiler steel by PAPVD process subjected to molten salt of Na_2SO_4-60%V_2O_5 at 900 °C for 50 cycles. Surface and cross-sectional studies were performed by AFM, SEM/EDS and XRD techniques to understand the corrosion kinetics and mechanism. T91 bare boiler steel as well as TiAlN-coated specimen has shown higher internal oxidation as well as weight gain. The better corrosion resistance of AlCrN-coated specimen has been observed by virtue of higher availability of Cr and Al in the oxide scale as well as adherent and dense coating. The betterment of AlCrN coating can be attributed to low internal oxidation as well as movement of Cr and Al toward oxide scale to form protective corrosion barriers.

Keywords hot corrosion, nano-coatings, PAPVD, SEM/EDS

1. Introduction

Degradation of materials at elevated temperature has been reported to be a precarious issue in various industrial operations as in steam generators, turbines, engines and materials have different behavior from their macroscopic counterparts due to their smaller characteristic sizes (Ref 8). Nano-structured coatings employing nano-structured materials (referred to grain size < 100 nm) have attracted the interest of many researchers (Ref 9, 10) by virtue of better features such as higher ductility, hardness, wear and corrosion resistance compared with the conventional coatings (Ref 11, 12). Transition metal nitride coatings have wide applications for wear and corrosion protection in cutting tools, forging and dies operating at elevated temperature (Ref 13). The nano-structured

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AC Impedance Spectroscopy, Conductivity and Optical Studies of Sr doped Bismuth Ferrite Nanocomposites

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Effect of Initial Chondritic Composition on the Differentiation of the Planetesimals in the Early Solar System

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***Abstract:*-The detailed numerical simulations for the differentiation of the planetesimals have been developed using ^{26}Al and ^{60}Fe as the heat sources. The two different scenarios have been used for the planetary differentiation. These scenarios deal with the origin of the basaltic achondrites either by the partial silicate melting, or from the residual melt left subsequent to the crystallization in a cooling magma ocean. In order to develop the numerical simulation, we have solved the radial heat conduction partial differential equation numerically using the finite difference method with the classical explicit approximation. In the present paper, differentiation of the planetesimals has been performed with the consideration of different bulk initial chondritic compositions. The initial composition of the planetesimals same as that of L, LL, CI and CV chondritic compositions have been considered.**

Key words: **Accretion, Chondritic composition, Differentiation, Kaidun meteorite**

I. INTRODUCTION

centre of the planetesimals. This comprehensive work deals with the two different possible cases of the planetary differentiation (Ghosh and McSween 1998), one in which initiation of the segregation of the core occur at 1213 K-1233 K, followed by silicate melting and the extrusion of the basaltic melt at higher temperature and second in which initiation of the core formation occur at 0.4 fraction of silicate melting without considering the crust-mantle differentiation. Gupta and Sahijpal (2010) numerically simulated two distinct planetary differentiation scenarios i) the partial melt origin of the basalts, and ii) the origin of the basalts from the residual melts of equilibrium crystallization in a cooling magma ocean. Gupta and Sahijpal (2010) made an attempt to understand the thermal evolution and differentiation in Vesta and other differentiated asteroids within these two distinct scenarios. This work was mostly focused on the initial H chondritic composition of the planetesimals as the melting of these chondrites can be well understood both theoretically and

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Review of Metal Contamination in Groundwater in Different States of India

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***Abstract*: - Water is important sources of the minerals for the livings beings. But it may become harmful for the living beings if it is contaminated by the pollutants. In this work literature review of water samples from different locations of India is carried out. Different types of techniques such as EDXRF (Energy Dispersive X- ray Fluorescence), PIXE (Proton Induced X- ray Emission), PIGE (Proton Induced Gamma ray Emission), AAS (Atomic Absorption Spectrophotometer) and ICP-OES (Inductively Coupled Plasma Optical Emission Spectroscopy) were used in elemental determination.**

I. INTRODUCTION

Water is a wonder of nature. It is a vital source for healthy growth and is a basic requirement for the survival of life. If the water is contaminated by any type of pollutants then it may become very harmful for the living beings. Groundwater is one of the sources of the water. More than the 50% of the world population is depending on the groundwater. The groundwater may contaminated by the several types of pollutants like metals, fertilizers, industries, urbanization, degradation of plants and animal bodies etc. Different locations have different types of contamination of groundwater and at different levels. Different types of techniques have been used for determining the contamination in water samples.

II. METHOD

Different types of techniques are used to detect the different types of metals in the groundwater samples such as EDXRF, PIXE, PIGE, AAS, ICP-OES etc. These techniques have different detection limits for the different elements. In the research paper (Atul Bhalla et. al., 2011) the EDXRF technique was used. PIXE and PIGE techniques were used by (Rajbir Kaur et. al., 2012). In the research papers (Akhilesh Jinwal et. al., 2009), (M. Arun Prasanth et. al., 2014), (Parul Virk et. al., 2010), (K. Mohan Kumar et. al., 2016), (A. Abdul Jameel et. al., 2012), (Dinore J. M. et. al., 2015), (Mohammed Ilyas Fazil et. al., 2012), (P. Susan Verghese et. al., 2015) and in (S. Dutta et. al., 2015) AAS technique is used. This technique is also called as Flame atomic absorption spectrophotometer. In the research paper (O. Venkata Subba Raju et. al., 2014) ICP- OES technique is used while in the research papers (Sunaina Mittal et. al., 2014) and in (Shaik Rameeza et. al., 2012) the standard methods are used. In the research paper (Chanchal Verma et. al., 2016) two techniques EDXRF and AAS are used. All these techniques provide concentration of different elements in different samples of groundwater.

III. RESULTS AND DISCUSSION

According to (Atul Bhalla et. al., 2011) the concentration of U is found to be very high (0- 212 µg/L) in some villages of Bathinda district but the highest concentration of U is observed in Balluana village (212 µg/L) of Bathinda district. The concentration of Fe is found to be very high (3036- 30443 µg/L) in the Buddah Nallah in Ludhiana but concentration of Fe is not very high in other locations. The concentration of Sr is also found to be very high (103- 6165 µg/L) in the villages of Bathinda district area. The highest value of the concentration of Sr is observed in Balluana village (6165 µg/L). The concentration of Cr, Pb, Zn, Cu and Mn has very high value in the Buddah nallah in Ludhiana. The concentration of Mo is found to be very high (227 µg/L) in the Ash slury samples from Guru Nanak Thermal Power Plant, GNTPP in Bathinda. The concentration of Se is found to be very high (8- 175 µg/L) in the Barwa region of Nawanshahr. Other metals have lower value of concentration than the permissible values.

According to (Rajbir Kaur et. al., 2012) the U concentration is found to be very high (15.7± 1.3 ppb) in the Harraipur village of Bathinda district. The concentration of Se is found to be very large in the Goniana (15.3± 1.3 ppb) (Bathinda) and the concentration of As is found to be very high in the Kiratpur (10.9 ppb) (Bathinda) but the concentration of other metals is found to be within the permissible values.

According to (Sunaina Mittal et. al., 2014) the maximum value of the concentration of Al (0.094 mg/l), Fe (0.131mg/l), K (195.30 mg/l), and Ca (76.11 mg/l) is found at Thermal colony, Goniana, National Fertilizers Limited, NFL and at Romana respectively. The maximum value of the concentration of Mg (59.09 mg/l) is also found at Romana.

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Five year study of particulate matter during Diwali in Amritsar, Punjab

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ABSTRACT

Diwali is one such festival of India marked with lighting of lamps and celebrations with major fireworks all over the country. The fascinating characteristic of Diwali is that every household participates in bursting firecrackers, leading to emission of huge volume of particulate matter into the atmosphere in one single day and cause significant short-term air quality degradation with possible impact on human health. In this paper five year (2011-2015) comparative study of particulate matter (PM) during Diwali period in the city of Amritsar, Punjab is carried out. The city was chosen for the study because it lies in the critical pollution zone region. In order to study the impact of different regions on PM concentration the whole city was divided into four zones which includes commercial areas, residential areas, sensitive areas of city and Shri Darbar Sahib. The study includes 24 hour average concentration of PM_{10}. The exceedence factor (EF) has been calculated for the four selected region. The continuous decrease (3.9 to 2.4) in the exceedence factor (EF) has been observed during Diwali day for Shri Darbar Sahib, still the region lies in the critical pollution zone. The lowest value of the

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The particulate matter concentration around the Golden Temple, Amritsar, Punjab

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ABSTRACT

Particulate matter is a complex mixture and includes both organic and inorganic particles and formed in the atmosphere by the natural and anthropogenic activities. Apart from affecting the climate these particles have adverse affect on the human health. In this paper, we seek to determine particulate matter around Golden Temple, Amritsar. The correlation has been studied between the mass concentrations of PM_{10} and $PM_{2.5}$, and the impact of meteorological parameters on their concentration has been studied. The monthly variations of PM_{10} and $PM_{2.5}$ are also investigated. The highest concentration of PM_{10} has been found in the month of October (~ 300 $\mu g/m^3$) and lowest in the month of April (~ 61$\mu g/m^3$). Whereas the highest concentration of $PM_{2.5}$ (~195$\mu g/m^3$) was observed in the month of May and lowest concentration was in the month of April (37 $\mu g/m^3$). The exceedence factor (EF) for the month of October (PM_{10}) and May ($PM_{2.5}$) is ~3. Such a high EF shows that air is highly polluted and it lies in the critical pollution zone. The main reason of such a high concentration was stubble burning, industrial emission and vehicular pollution.

Key Words:- Golden Temple, Particulate Matter (PM_{10}, $PM_{2.5}$), Exceedence Factor

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To Detect Heavy Metals Accumulation in Sewage Water Irrigated Green Leafy Vegetables

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ABSTRACT

Disposal of sewage water and industrial wastes is a great problem. Often, it is drained to the agricultural lands where it is used for growing crops including vegetables. Though, these sewage effluents are considered a rich source of organic matter and other nutrients but they also elevate the level of heavy metals like Iron, Manganese, Copper, Zinc, Lead, Chromium, Nickel, Cadmium, and Cobalt in receiving soils. As a result, it leads to contamination of the food chain, because vegetables (especially green leafy vegetables) absorb heavy

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1,3-Bis(cyanomethoxy)calix[4]arene capped CdSe quantum dots for the fluorogenic sensing of fluorene†

Rabindra Kumar,[a] Meenu Arora,[b] Anil K. Jain[c] and J. Nagendra Babu*[cd]

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Capping of 1,3-bis(cyanomethoxy)-*tert*-butylcalix[4]arene (CAD) onto CdSe quantum dots (QDs) was characterized by a fluorescence enhancement of the QDs (λ_{em} = 580 nm) upon surface interaction with the phenolic moiety of CAD. CAD@QD showed selective and sensitive 1.67 fold fluorescence enhancement in the presence of fluorene among fifteen PAHs. The fluorescence enhancement was characterized by monolayer adsorption of fluorene on to the surface of CAD@QD. The limit of detection for fluorene was observed to be 0.8 nM. This method was used and compared with detection of fluorene in spiked respirable dust (PM_{10}) samples collected during an open biomass (stubble) burning event.

Introduction

Polynuclear aromatic hydrocarbons (PAHs) are a family of pollutants emitted involuntarily during the combustion processes in our daily lives including cooking, domestic heating, smoking, charbroiling meat, and open fires (including forest fires & open biomass burning, incense and candle emissions).[1] PAHs are used to make dyes, plastics, and pesticides and some are even used in medicines[2] and they find their way into the human body commonly through air, soil, water and food.[3] PAHs have been reported to be potential carcinogens and mutagens.[4] Thus, the United States Environmental Protection Agency (USEPA) has regulated this class of chemicals in ambient air, water and soil to a trace level.[5] The analysis of PAHs in environmental samples are presently being carried out using extraction followed by high performance liquid chromatography (HPLC) with a UV-vis/fluorescence detector[6] and Gas Chromatography-Mass Spectrometry/Flame Ionization Detector (GC-MS/FID).[2,7] However, these methods vary from matrix to matrix, are costly, time consuming and require skilled manpower. Thus, there is a dire need for simple, cost-effective, real-time field analysis of PAHs with low detection limits.

Fluorogenic sensing is a key approach, for selective and sensitive detection of analyte. Fluorogenic sensing of metal and anion have been widely studied, but few reports exists in the sensing of organic analytes.[8] Sensing of aromatic analytes is based on the phenomenon of inclusion, whereby the chemosensor has a receptor moiety comprising of a cavity having potential for formation of inclusion complex. These inclusion based chemosensor receptor moieties exploit weak intermolecular bonding with the analyte of interest. Container molecules which form inclusion complex with small organic molecules include, cyclodextrins,[9] calixarenes,[10] cucurbiturils and pillararenes.[11] Of these, calixarenes are a versatile class of compounds which have significantly been studied for inclusion behaviour.[8] Calix[4]arenes have the advantage of easy scalable synthesis, easy derivatization on lower rim, upper rim and bridging methylene moieties, with significant conformational control during derivatization.[12] Optical sensors based on functionalized calix[4]arene have widely been studied for the recognition of cations,[13] anions[14] and various neutral analytes.[14] However, there have been limited studies on the fluorogenic recognition behavior of calix[4]arene based receptors for small organic molecules of environmental interest. The limitation is partly accounted to the challenges in designing of suitable fluorogenic derivatives of calix[4]arene for the relay of inclusion

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Review article

Recent insights into synthetic β-carbolines with anti-cancer activities

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ABSTRACT

Cancer, an uncontrolled and rapid proliferation of abnormal cells, has become one of the leading cause of death worldwide. The development of resistance among the numerous drugs in clinical use has provided strong impetus for the identification and development of novel cancer therapeutics. β-carbolines constitute an important class of pharmacologically active scaffolds known to exert their anticancer activities *via* diverse mechanisms. The purpose of present review article is to update the readers on the current developments in β-carbolines with an emphasis on synthetic strategies, structure-activity relationships, mechanism of action and *in vivo* studies wherever possible.

Contents

Sr. No. 21

1 H -1,2,3-Triazole-Tethered Uracil-Ferrocene and Uracil-Ferrocenylchalcone Conjugates: Synthesis and Antitubercular Evaluation

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DEPARTMENT OF MATHEMATICS

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On L^1-Convergence of Modified Trigonometric Sums under Some Classes of Coefficients

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Abstract

Results regarding L^1–convergence of modified cosine and sine sums introduced by Kumari and Ram have been studied and improved results have been obtained under some classes of coefficients.

2010 Mathematics subject classification: 42A20, 42A32.

Keywords and phrases: L^1–convergence, Dirichlet Kernel, modified cosine sums.

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Numerical Approach to Differential Equations of Fractional order Bratu-type Equations by Differential Transform Method

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Abstract

In the present paper, the Differential Transform Method (DTM) is applied to drive its solution (approximate) of the fractional Bratu-type equations. The fractional derivatives are represented in the caputo sense. The convergence and uniqueness of this method are also studied. Three examples are illustrated to prove that the presented techniques efficiency and implementation of the method and the results are compared with exact solutions.

Keywords: Fractional Bratu-type equations, Caputo fractional derivatives, Differential Transform Method, Numerical Solutions.

1. INTRODUCTION:

We know that Fractional calculus is playing vital role in the field of Mathematics. It deals with derivatives and integral of arbitrary orders. Fractional differential equations and its results used in general in many branches of mathematics and deals with Science and Engineering also. Many effective different techniques for solving its numerical and analytical solutions of FDEs have been presented **[6-8]**.

We have used notations $D^{n\alpha}$ for Jumarie type fractional derivative operator here $n \in \Re, \alpha < 1$. There are many types of fractional integral and differential operators.

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An Empirical Analysis of Relationship between Stock Market Development and Economic Growth: The Indian Context

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ABSTRACT

The debate on the relationship between stock market development and economic growth has always been a centre of attention in numerous empirical studies in both developed and developing countries. Stock market has been emerged as a virtual market for raising the funds by the corporate houses for future investments. An active stock market indicates frequent trading of large volume of stocks and positive sentiments of investors towards the future scope of reaping high rate of return as well as economic growth. The main objective of the present study is to find out the relationship between stock market development and economic growth in India during 2004-2014. Many previous studies use market capitalisation as indicator of stock market development but rise in volatility in financial market has raised the eyebrows of many financial analysts and mark the consistency

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Analysis of Impact of Country of Origin (COO) on Consumers' Perception – with context of Electronic Goods

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Abstract

The effect of rise of globalization has been visible on the consumer's buying behaviour. The brand image of product is directly affected by the globalization of market. The reputation of country on globalization index affects the image of its home companies and their products. The Country of Origin has been emerging as selection criteria while purchasing a product. Consumers try to perceive the quality of the product on the basis of its Country of Origin. The current research provides empirical results about the influential limit of Country of Origin (COO) of products originating from different countries on the buying behaviour of consumers. The results of the research work suggest the importance of adoption of pragmatic approach to improve the effectiveness of global marketing strategies in Indian market. Companies must adopt latest technologies in various manufacturing products to enhance value for money context of product at lower prices. The results document that ethnocentrism is not the big influential factor as consumer prefers value for money rather than simple tag of country. Consumers prefer to spend on local brands local brands to foreign brands if they attain similar product attributes (features, quality, performance etc.) at similar or lower price in the domestic market.

DEPARTMENT OF ELECTRONICS AND COMMUNICATIONS ENGINEERING

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Regular paper

Channel estimation with ISFLA based pilot pattern optimization for MIMO OFDM system

Harjeet Singh [a], Savina Bansal [b]

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Abstract

In multiple input multiple output orthogonal frequency division multiplexing (MIMO-OFDM) systems, the channel state information should be known by the receiver for obtaining transmitted data. Channel estimation algorithms are used to examine the multipath effects of frequency selective

Sr. No. 27

Improvement in Time Varying Multipath Channel Estimation

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ABSTRACT

In this work, we propose a new algorithm that modifies the LS channel estimation technique by using a feedback LS channel estimator to improve upon its estimation capabilities and still retaining its simplicity. To examine its usefulness especially for wireless mobile applications, performance in terms of the symbol error rate is analyzed with varying Doppler frequency and delay parameters, which is found to be quite optimistic in comparison to LMMSE and LRMMSE algorithms.

Keywords

Pilots symbols, Symbol error rate, Doppler shift, OFDM.

1. INTRODUCTION

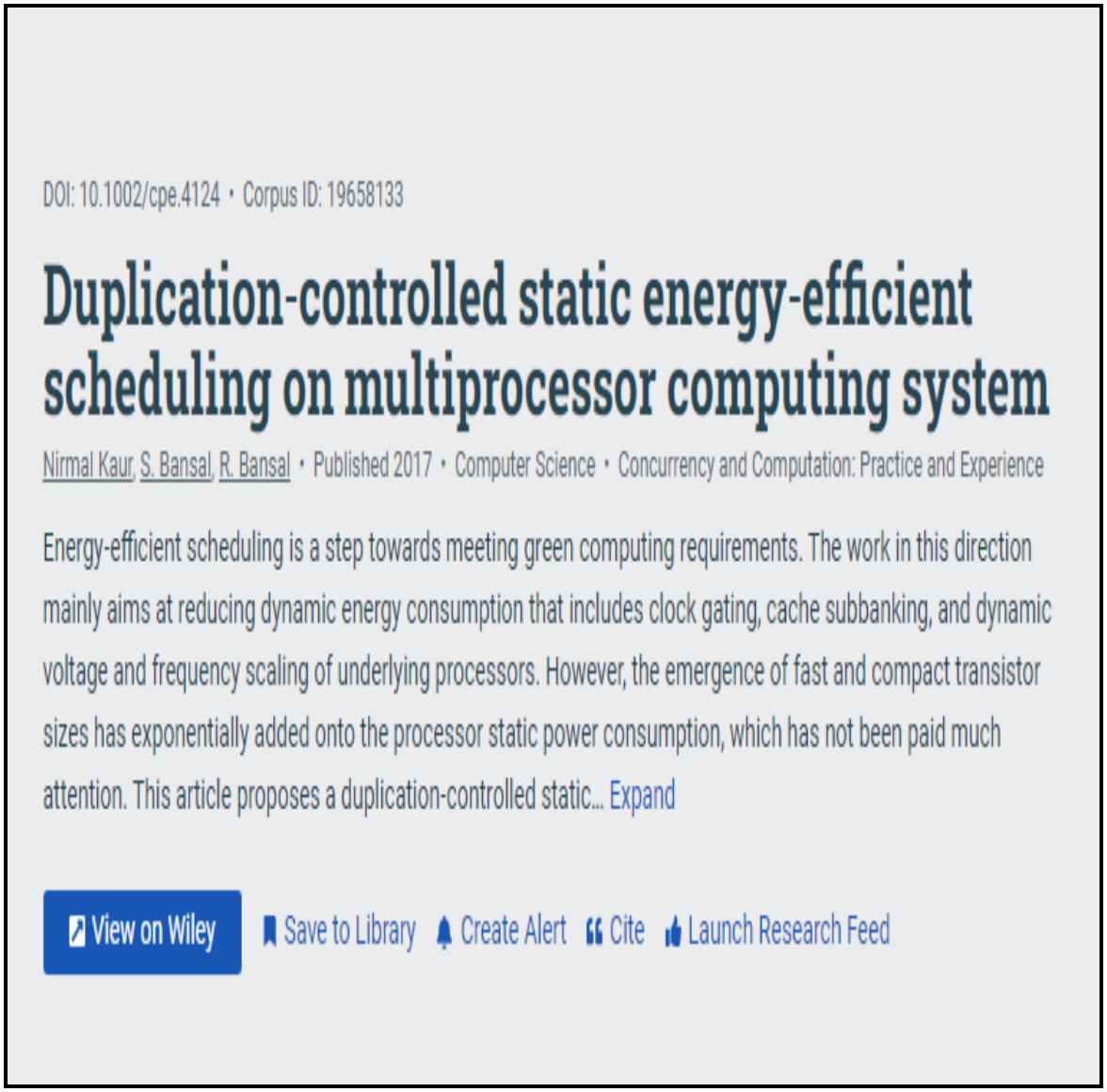
Wireless communication channels are practically time variant and frequency selective channels, which may lead to inaccurate signal reception for wireless mobile applications. Channel estimation is necessary to recover the original signal from channel irregularities [1] [2]. In classified further into decision directed and data aided channel estimation process. Decision directed estimation of channel can be viewed as a special case of iterative channel estimation.

According to XiangRen, Wen Chen, and Meixia Tao(2015), OFDM is sensitive to the time selectivity caused by high-mobility channels, which costs much spectrum or time resources to obtain the accurate channel state information (CSI). Therefore, the channel estimation in high-mobility OFDM systems has been a long-standing challenge and thus proposed position-based compressed channel estimation method for high-mobility OFDM systems. Thus pilot symbol and the placement are jointly designed by the proposed algorithm to minimize the system average coherence.

3. Proposed feedback LS channel estimator

Mismatching of delay spread and the Doppler shift

Sr. No. 28



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Duplication-controlled static energy-efficient scheduling on multiprocessor computing system

Nirmal Kaur, S. Bansal, R. Bansal • Published 2017 • Computer Science • Concurrency and Computation: Practice and Experience

Energy-efficient scheduling is a step towards meeting green computing requirements. The work in this direction mainly aims at reducing dynamic energy consumption that includes clock gating, cache subbanking, and dynamic voltage and frequency scaling of underlying processors. However, the emergence of fast and compact transistor sizes has exponentially added onto the processor static power consumption, which has not been paid much attention. This article proposes a duplication-controlled static... Expand

Sr. No. 29

Heterogeneity-aware Energy-efficient Clustering (HEC) Technique for WSNs

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Abstract

Efficient energy consumption in WSN is one of the key design issues for improving network stability period. In this paper, we propose a new Heterogeneity-aware Energy-efficient Clustering (HEC) technique which considers two types of heterogeneity – network lifetime and of sensor nodes. Selection of cluster head nodes is done based on the three network lifetime phases: only advanced nodes are allowed to become cluster heads in the initial phase; in the second active phase all nodes are allowed to participate in cluster head selection process

Sr. No. 30

Feedback based Channel Estimation for Time Varying Multipath System

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Abstract: - Channel estimation is a crucial design issue for faithful reception of high data rate mobile applications in a wireless communication system. Channel estimation algorithms, mainly available in literature, include least square (LS) estimation, linear minimum mean squared error (LMMSE) estimation, and low rank linear minimum mean squared error (LRMMSE) estimation with varying degrees of performance. MMSE-based algorithms offer higher accuracy though at the cost of complexity in comparison to the low complexity LS algorithm. In this work, we propose an algorithm based on the LS channel estimation technique by using decision based feedback technique to improve upon its estimation capabilities and still retaining its simplicity. To examine its usefulness especially for wireless mobile applications, performance in terms of the symbol error rate is analyzed with varying Doppler frequency and delay parameters, which is found to be quite optimistic in comparison to LMMSE and LRMMSE algorithms.

Sr. No. 31

Indian Journal of Science and Technology

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Year: 2017, Volume: 10, Issue: 31, Pages: 1-8

Original Article

Smart Homes: Sensible Living Using Internet of Things

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Year: 2017, Volume: 10, Issue: 31

ABSTRACT

Objectives: Home for a belonging is the best place than ever, it provides a restful shelter to us. It is a dream to

S.no 32

Energy conscious scheduling with controlled threshold for precedence-constrained tasks on heterogeneous clusters

Nirmal Kaur, Savina Bansal, Rakesh Kumar Bansal

First Published November 28, 2016 | Research Article | Check for updates
https://doi.org/10.1177/1063293X16679001

Article information

Abstract

Efficient task scheduling of concurrent tasks is one of the primary requirements for high-performance computing platforms. Recent advances in high-performance computing have resulted in widespread performance improvement though at the cost of increased energy consumption and other system resources. In this article, an energy conscious scheduling algorithm with controlled threshold has been developed for precedence-constrained tasks on heterogeneous cluster, which aims at lower makespan along with reduced energy consumption. Energy conscious scheduling with controlled threshold algorithm combines the benefits of dynamic voltage scaling with controlled threshold-based duplication strategy to achieve its objectives. Effectiveness of the proposed algorithm is analyzed in comparison with available duplication- and non-duplication-based scheduling algorithms (with and without dynamic voltage scaling approach) to ascertain its performance and energy consumption. Exhaustive simulation results on random and real-world graphs demonstrate that energy conscious scheduling algorithm with controlled threshold has the potential to reduce energy consumption and makespan.

DEPARTMENT OF ELECTRICAL ENGINEERING

Sr. No. 33

Neural Comput & Applic (2017) 28:1123–1148
DOI 10.1007/s00521-015-2114-6

ORIGINAL ARTICLE

Hybrid HS–random search algorithm considering ensemble and pitch violation for unit commitment problem

Vikram Kumar Kamboj[1] · S. K. Bath[2] · J. S. Dhillon[3]

Received: 16 June 2015 / Accepted: 4 November 2015 / Published online: 30 November 2015

Abstract Harmony search (HS) is a population-based metaheuristics search algorithm inspired from the musical process of searching for a perfect state of harmony. The pitch of each musical instrument determines the aesthetic quality, just as the fitness function value determines the quality of decision variables. In the musical improvisation process, all players sound pitches within possible range together to make one harmony. If all the pitches make a good harmony, each player stores in his memory that experience and the possibility of making a good harmony is increased next time. Even though HS has the ability to escape from local minima, it does not require differential gradients and initial value setting for the variables, is free from divergence and has strong ability to explore the regions of solution space in a reasonable time. However, it has lower exploitation ability in later period and it easily trapped into local optima and converges very slowly. To improve the exploitation ability of HS algorithm in later stage and provide global optimal solution, a novel and hybrid version of harmony search combined with random search algorithm is presented in the proposed research to solve single-area unit commitment problem of electric standard IEEE systems consisting of 4, 10, 20 and 40 generating units. The effectiveness of proposed hybrid algorithm is compared with other well-known evolutionary, heuristics and metaheuristics search algorithms, and it has been found that performance of proposed algorithm is much better than of classical harmony search algorithm and improved harmony search algorithm as well as recently developed algorithms. Sensitivity analysis on proposed algorithm shows that low value of pitch adjustment rate results in better cost, and parametric test on proposed algorithm shows the rejection of the null hypothesis at the alpha significance level.

Keywords Hybrid harmony search (HHS) · Pattern search (PS) · Random search (RS) · Unit commitment problem (UCP)

1 Introduction

Today's power system is characterized by large proportions, high interconnections and high nonlinearities, as the

Sr. No. 34

Neural Comput & Applic (2017) 28:1559–1581
DOI 10.1007/s00521-015-2124-4

ORIGINAL ARTICLE

A novel hybrid DE–random search approach for unit commitment problem

Vikram Kumar Kamboj[1] · S. K. Bath[2] · J. S. Dhillon[3]

Received: 21 July 2015 / Accepted: 4 November 2015 / Published online: 10 December 2015

Abstract Differential evolution (DE) is a population-based stochastic search algorithm, whose simple yet powerful and straightforward features make it very attractive for numerical optimization. DE uses a rather greedy and less stochastic approach to problem-solving than other evolutionary algorithms. DE combines simple arithmetic operators with the classical operators of recombination, mutation and selection to evolve from a randomly generated starting population to a final solution. Although global exploration ability of DE algorithm is adequate, its local exploitation ability is feeble and convergence velocity is too low and it suffers from the problem of untime convergence for multimodal objective function, in which search process may be trapped in local optima and it loses 4, 10, 20 and 40 generating units. The effectiveness of proposed hybrid algorithm is compared with other well-known evolutionary, heuristics and meta-heuristics search algorithms, and by experimental analysis, it has been found that proposed algorithm yields global results for the solution of unit commitment problem.

Keywords Hybrid differential evolution (HDE) · Particle swarm optimization (PSO) · Random search · Single-area unit commitment problem (SAUCP)

1 Introduction

Sr. No. 35

Neural Comput & Applic
DOI 10.1007/s00521-016-2240-9

ORIGINAL ARTICLE

Multiobjective multiarea unit commitment using hybrid differential evolution algorithm considering import/export and tie-line constraints

Vikram Kumar Kamboj[1] · S. K. Bath[2] · J. S. Dhillon[3]

Received: 3 August 2015 / Accepted: 16 February 2016

Abstract Recent power system networks are characterized by large proportions, high interconnections, and high nonlinearities. Challenge of supplying the nation with high-quality, reliable electrical energy at a reasonable cost converted government policy into deregulation and restructuring environment. To achieve significant cost-savings, multiarea unit commitment strategies are employed, whose intention is to establish the optimal commitment stratagem for power generating units situated in numerous areas which are interconnected through tie-lines, and combined operation of generation resources can result in considerable operational cost-savings. Differential evolution is a population-based stochastic search algorithm, whose simple yet powerful and straightforward features make it gorgeous for optimization. Differential evolution uses somewhat greedy and less stochastic approach for optimization problem solution. Although global exploration ability of differential evolution (DE) algorithm is adequate, its local exploitation ability is feeble and convergence velocity is too low, and it suffers from the problem of untimely convergence for multimodal objective function, in which search process may be trapped in local optima and it loses its diversity. Also, it suffers from the stagnation problem, where the search process may infrequently stop proceeding toward the global optimum even though the population has not converged to a local optimum or any other point. To improve the exploitation ability and global performance of DE algorithm, a novel and hybrid version of differential evolution algorithm combined with random search algorithm is presented in the proposed research to solve multiobjective and multiarea unit commitment problem of electric power system. The performance of the proposed hybrid algorithm is tested with benchmark of three-area interconnected system, which consist of IEEE-30 Bus system. Experimental results show that proposed technique has the prospective for the solution of multiobjective and multiarea unit commitment problem and power generation scheduling in deregulated electricity market with import and export constraints.

Keywords Deregulated electricity market · Hybrid differential evolution (HDE) · Multiarea unit commitment

DEPARTMENT OF MECHANICAL ENGINEERING

Sr. No. 36

Dimensional accuracy analysis of coupled fused deposition modeling and vapour smoothing operations for biomedical applications

Jasgurpreet Singh Chohan, Rupinder Singh, Kamaljit Singh Boparai, Rosa Penna, Fernando Fraternali

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Source

Composites Part B: Engineering > 2017 > 117 > C > 138-149

Abstract

Fused Deposition Modeling (FDM) is one of the most extensively used Additive Manufacturing technique which has substantially shortened the product development time and cost. The application has been extended to fabricate biomedical implants through investment casting process. But the FDM replicas exhibit poor surface quality which requires further post finishing. Thus, it is very difficult to achieve adequate dimensional accuracy as surface finishing techniques resulted in material removal and erosion of upper surface. The vapour smoothing is an advanced finishing technique which eliminates tool-workpiece contact and yield ultra smooth finish but dimensional accuracy of FDM replicas is yet to be ascertained. In present research, the efforts are made to explore the influence of FDM and VS process parameters in dimensional features of complex designs. The influence of six parameters on radial (head di...

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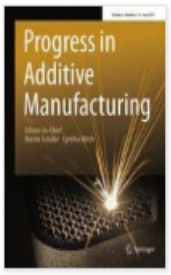
Sr. No. 37

Investigations for obtaining desired strength of Nylon6 and Fe powder-based composite wire for FDM feedstock filament



Journal: Progress in Additive Manufacturing > Issue 1-2/2017

Authors: Harish K. Garg, Rupinder Singh

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Abstract

In the present work, an effort has been made for modelling the peak strength of Nylon6-Fe powder composite-based feedstock filament (wire) for fused deposition modelling (FDM) process. The developed filament has been used to prepare functional prototypes with ferromagnetic characteristics. The methodology involves the use of historical data approach of response surface methodology (RSM) to study the effect of input process parameters (namely: barrel temperature, die temperature, screw speed, speed of the winding machine of single screw extruder and melt flow index of composite material as rheological property) on peak strength of the filament developed. The model for prediction of peak strength of Nylon6-Fe powder composite filament has been counter verified by actual experimentation. Further, the results of the study also highlights that Nylon6-Fe composite-based FDM filament enabled successful run of this material without any change in hardware/software of the commercial FDM setup.

Sr. No. 38

Technical Paper | Published: 18 June 2016

Tribological Properties of Fe–Nylon6 Composite Parts Prepared Using Fused Deposition Modelling

Harish Garg & Rupinder Singh

Transactions of the Indian Institute of Metals **70**, 1241–1244 (2017) | Cite this article

265 Accesses | **7** Citations | Metrics

Abstract

The present research work highlights the fabrication of Fe-nylon6 composite wire by varying proportion of Fe in nylon6 matrix (by weight) along with wear and friction characteristics of the composite wire. The composite wire prepared has been used as a feedstock filament in place of the existing ABS material in the fused deposition modelling (FDM) machine (without any software and hardware modifications in the existing FDM setup). Comparison of wear of three different Fe-nylon6 compositions and ABS at varying loads along with the variation of coefficient of friction and the frictional force has been carried out. The objective is to study the variation of wear and friction characteristics with the variation of the filler material (Fe) in the composite. It is concluded that all the three composite materials are highly wear resistant,

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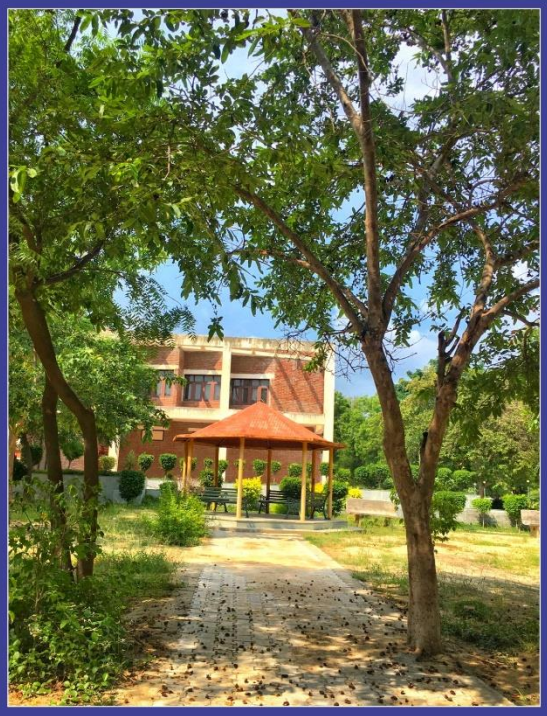

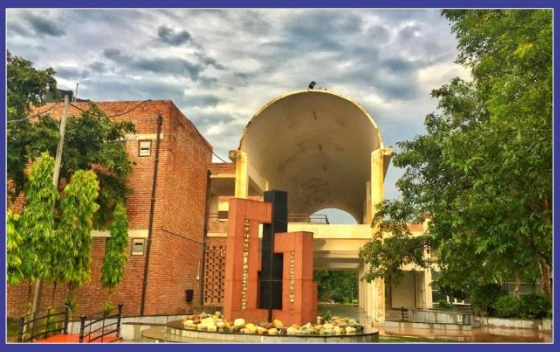

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