

**PROCEEDINGS  
EMEA-2020**

**National e-Conference on  
ESSENCE OF MATHEMATICS AND  
ENGINEERING APPLICATIONS**

**2<sup>nd</sup> & 3<sup>rd</sup> December, 2020**

Editors :  
Dr. B.V. Appa Rao  
Dr. D. Sateesh Kumar  
Dr. W. Sridhar

Organized by :  
**Department of Mathematics**



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# **PROCEEDINGS EMEA 2020**

*National e Conference on*  
**Essence of Mathematics and Engineering Applications**  
**EMEA-2020**

*(2<sup>nd</sup> & 3<sup>rd</sup> December 2020)*

*Convener*

**Dr.B.V.Appa Rao**

*Co-Conveners*

**Dr.D.Sateesh Kumar**

**Dr.W.Sridhar**

## ***Preface***

Koneru Lakshmaiah Education Foundation , Vaddeswaram ,Guntur is organizing a multi-disciplinary national conference entitled " ESSENCE OF MATHEMATICS AND ENGINEERING APPLICATIONS(EMEA-2020)" in virtual mode on 2<sup>nd</sup>&3<sup>rd</sup> December, 2020 has provided a global platform bringing Academia, Researchers, Engineers, Industry experts and Students together to share their knowledge, work and experiences both through the presentations from the conference and dissemination of high quality research publications in the areas of Mathematics and Science. This acts as an international forum for online interactions with eminent speakers and renowned experts about the recent innovations, trends and concerns as well as practical challenges encountered and solutions adopted in the field of Mathematics and Science.

We are earnestly thankful to our Management, Vice-Chancellor,Pro-VC's,Dean-R &D,Director-FED,Vice-Principal-FED,Chair persons and members of various committees, International and National Advisory Committees for their wholehearted support and encouragement.

We are also thankful for all the authors who have contributed their research works to the conference. We truly believe that the participants will find the discussions fruitful and will appreciate the opportunity for setting up future collaborations.

**CONVENER**

### **ABOUT THE K L E F:**

The Koneru Lakshmaiah Charities was established as a trust in the year 1980 with its official address at Museum road, Governorpet, Vijayawada and started KL College of Engineering in the Academic year 1980-81. The trust was converted into a Society by the name Koneru Lakshmaiah Education Foundation in the year 1996. The KL College of Engineering has attained autonomous status in the year 2006 and in February 2009, the Koneru Lakshmaiah Education Foundation Society was recognized as Deemed to be University offering academic programs at UG, PG, Doctoral and Post-Doctoral levels. The University is recognized by the All India Council for Technical Education (AICTE), New Delhi, has been accredited by the National Board of Accreditation (NBA), and is certified by ISO 9001-2015. It has been accredited by National Assessment and Accreditation Council (NAAC) with A++ grade with 3.57 CGPA on 4-point scale. The vision of the institution is to be a globally renowned university and the mission is to impart quality higher education and to undertake research and extension with emphasis on application and innovation that cater to the emerging societal needs through all-round development of students enabling them to be globally competitive and socially responsible citizens with intrinsic values.

### **ABOUT THE DEPARTMENT:**

The department of Mathematics focuses on pure and applied mathematics catering to the professional needs of students of varied backgrounds. The department is offering courses for students majoring in Science, Engineering, Commerce and Business Administration. The department is offering M.Sc. Program in Applied Mathematics and Research Program leading to Ph.D.

### **LOCATION:**

The KL Deemed to be University is located at Green fields, Vaddeswaram, Guntur Dist, Andhra Pradesh in a 100 acre green campus abutting Buckingham Canal about 9 km from Vijayawada railway station and bus stand. Vijayawada is located on the banks of river Krishna in the state of Andhra Pradesh. The city is well connected by National Highway and railways with Chennai (440km), Hyderabad (275km) and Visakhapatnam (385km). The city is the gateway for trains running from North to South India. Vijayawada is well connected by daily flights from the cities Visakhapatnam, Hyderabad, Chennai, Bangalore and Delhi.

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Dr. W. Sridhar, Associate Prof., Dept. of Mathematics



## **PRESIDENT'S MESSAGE**

An engineer needs to use mathematics and apply science for engineering solutions to many types of problems pertaining to different disciplines.

Proper knowledge of mathematics is the prime requisite requirement for engineering various kinds of applications. An engineer must know general purpose mathematics and mathematics related to a specific discipline. An engineer having clear knowledge of the mathematics will be able to engineer solutions to the problems that are to be solved with least cost and time.

I am happy that the department of Mathematics, KLEF is organizing two day national conference on “Essence of Mathematics and engineering applications(EMEA-2020)” which is quite apt for every engineering and also non engineering student. Various discussions and presentations on this topic should bring out various present day usages of mathematics using which one will be able to find solutions to complex problems.

I wish the organizers good luck for successfully conducting the National Conference and come out with the proceedings and recommendations which can be circulated to all the engineers for their knowledge and usage of the findings.

**Er. KONERU SATYANARAYANA  
PRESIDENT**



## **CHANCELLOR'S MESSAGE**

I am Happy to know that the Department of mathematics is organizing the two day national conference on “Essence of Mathematics and Engineering Applications “from 2<sup>nd</sup> -3<sup>rd</sup> December 2020.

Several specialists from IITs and International Professors are participating and contributing on several challenging Industrial problems and solutions in the conference.

The Two Day Conference is sure to provide a rich experience to the young researchers who can exchange ideas and learn from the expert participants and work towards greater achievements useful to the research community.

I wish all the delegates to interact and participate in all sessions to accomplish scientific breakthroughs.

I wish the conference a great success.

**PROF.S.S.MANTHA  
CHANCELLOR**



## **VICE-CHANCELLOR'S MESSAGE**

I extend my warm welcome to all the participants and appreciate the Department of Mathematics, KLEF Deemed to be University for their commitment and superb drive in organizing this **Two Day National Conference “Essence of Mathematics and Engineering Applications(EMEA-2020)”**. Conferences are the platforms for academic discourse. I am certain that this platform proves to be a great opportunity for the researchers, postgraduate students and industrial people for strengthening their academic and research aspirations. I believe in the virtual discussions and findings which can be generated only through these kinds of research and development (R&D) activities.

Mathematics is a rapidly growing interdisciplinary branch that incorporates many new advances in computer science and has applications in other sciences and industry. The deliberations of the delegates will undoubtedly generate lots of interesting and innovative concepts which pave the way to industrial commercialization. I extend my best wishes to the students and faculty who are a part of our University and to those who seek to join us in this conference for sharing and creating knowledge. I am sure that you will feel proud of sharing your academic excellence in our vibrant campus and wish you all a grand success.

**PROF. L. S. S. REDDY**  
**VICE-CHANCELLOR**





## **DIRECTOR'S MESSAGE**

I congratulate the Department of Mathematics of KLEF Deemed to be University in organizing this *Two Day National Conference “ Essence of Mathematics and Engineering Applications(EMEA-2020)”* I am sure that this conference becomes a right platform for the students, researches and industrial delegates to come up with innovative deliberations. Mathematics has become more and more international, and solidarity across countries which has been increasing at a fast pace. It is not just a language of science, but it is also a science of formulating theories for other sciences. Besides fundamental research, the importance of the interaction of mathematics with other areas of science, computers and industry is now largely in demand.

I whole heartedly appreciate the efforts of the organizers of the Department of Mathematics for coming forward with such a challenging theme of contemporary relevance. I hope that this conference will definitely become a landmark event in facilitating knowledge exchange and research discourse. I wish all the participants of the conference to come up with useful research deliberations.

**PROF.A. JAGADEESH  
CCO & DIRECTOR-FED**



### **VICE-PRINCIPAL'S MESSAGE**

It is quite gratifying to note and with great pleasure, I would like to state that the Department of Mathematics of our college is hosting its National Virtual Conference on Essence of Mathematics and Engineering Applications (EMEA-2020) on 2<sup>nd</sup> & 3<sup>rd</sup> December, 2020. Organizing such an event at this point of time reinforces our objective of developing an environment for the exchange of ideas towards technological developments. I wish the conference would be able to deliberate on current issues of national and international relevance, particularly in the field of Mathematics Modelling in Ecology, Rough Set Theory and its Application, Game Theory Models and Application WSNs, Life with Mathematics and Integration of Technology in Education. There have been unprecedented numbers of quality papers that are to be presented in the conference. I am sure that this occasion will provide an affable environment for the researchers and academicians to freely exchange the views and ideas with others. I convey my warm greetings and felicitations to the organizing committee and the participants and extend my best wishes for the success of the conference.

**PROF.V.KRISHNA REDDY**  
**VICE-PRINCIPAL**



### **CONVENER'S MESSAGE**

On behalf of the national Virtual Conference on Essence of Mathematics and Engineering Applications (EMEA-2020), I welcome all the invited keynote speakers, session chairs, paper presenters and participants. It is my great pleasure to serve as convener for the conference being organized at our University. I hope this conference provide online lively events where the researchers and practitioners from around the world join together to discuss a wide array of important issues in Mathematics and Science.

The theme of conference “Essence of Mathematics and Engineering Applications(EMEA-2020)” is purposely broad so that we could have an eclectic array of papers ranging over a variety of the mess including such topics as innovative research practices, learning sciences, and utilization of technology in the present pandemic situation like Covid-19 and more. We have received 90 papers from the authors in different fields all over the globe.

I hope during your time at the conference in virtual mode will provide an opportunity to engage with your peers to discuss your ideas for research and practice.

**PROF.B.V.APPA RAO**  
**CONVENER-EMEA-2020**  
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**Program Schedule Day1**  
**ESSENCE OF MATHEMATICS AND ENGINEERING APPLICATIONS (EMEA-2020)**  
 K.L.E.F., Deemed to be University  
 Vaddeswaram, Guntur (Dt), Andhra Pradesh  
 2<sup>nd</sup> & 3<sup>rd</sup> December, 2020

Day - I: (2 <sup>nd</sup> Dec. 2020, Wednesday)			
S.No	Time	Event	Presented by
1	10:00AM – 10:45AM	Inauguration function	
2	10:45AM – 11:00AM	Tea Break	
3	11:00AM - 12:00AM	Invited Talk-1 (ESSENCE OF MATHEMATICS IN ENGINEERING APPLICATIONS)	Prof. P. G. Siddeswar Christ University, Bangalore
4	12:00PM - 12:15PM	Panel Discussions	
5	12:15PM - 1.15PM	Invited Talk-2 (Moving Mesh Methods for Burger's and Navier-Stokes Equations)	Prof. Natesan Srinivasan IIT-Guwahati
6	1:15PM - 1:30PM	Panel Discussions	
7	1:30PM - 2.30PM	LUNCH BREAK	
8	2:30PM - 5.00PM	Paper Presentations (Parallel Sessions)	

**Program Schedule Day2**  
**ESSENCE OF MATHEMATICS AND ENGINEERING APPLICATIONS (EMEA-2020)**  
 K.L.E.F., Deemed to be University  
 Vaddeswaram, Guntur (Dt), Andhra Pradesh  
**2<sup>nd</sup> & 3<sup>rd</sup> December, 2020**

Day - II: (3 <sup>rd</sup> Dec. 2020, Thursday)			
S.No	Time	Event	Presented by
1	9:30AM – 10:30AM	Invited Talk-3 (Thermally Radiant Williamson Nanofluid Flow over a Permeable Stretching Sheet with Viscous Dissipation and Joule Heating Effects)	Prof.E.H.Gorfie (Bahir-Dar University,Ethiopia)
	10:30AM – 10:45AM	Panel Discussions	
2	10:45AM – 11:45AM	Invited Talk-4 (Likelihood Ratio And Parametric Bootstrap Tests For Analysis Of Variance Under Heteroscedasticity)	Prof. Somesh Kumar IIT-Kharagpur
3	11:45AM - 12:00PM	Panel Discussions	
4	12:00PM - 12:15PM	Tea Break	
5	12:15PM - 1:30PM	Paper Presentations (Parallel Sessions)	
6	1:30PM - 2.30PM	LUNCH BREAK Tea Break	
7	2:30PM - 3:15PM	Invited Talk-5 The role of analytical methods to solve Falkner-Skan differential equation	Prof.E.K.Ghiasi Islamic Azad University,Iran
8	3:15PM - 3:30PM	Panel Discussions	
9	3:30PM - 4:30PM	Paper Presentations (Parallel Sessions)	
10	4:30PM - 5.00PM	valedictory function	



**INVITED TALKS**

## ESSENCE OF MATHEMATICS IN ENGINEERING APPLICATIONS



**Pradeep G Siddheshwar**  
Senior Professor of Mathematics  
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Illustrative examples from engineering applications that involve ODEs and PDEs will be chosen to drive home the point that such applications will invariably involve mathematical models and hence there is a need to know mathematics well in order to be a good practising engineer. Three models involving ODEs and three involving PDEs will be considered and explanation will be given about the background physics and engineering behind the mathematical concepts. Examples will be drawn from fluid dynamics, electromagnetic theory and allied areas.

## **MOVING MESH METHODS FOR BURGER'S AND NAVIER-STOKES EQUATIONS**



**S. Natesan,  
Department of Mathematics,  
IIT Guwahati  
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In this talk, we focus on the numerical simulation of the viscous Burger's equation and the incompressible Navier-Stokes equations. Generally, the solution of Burger's equation exhibit boundary layers, in order to obtain uniformly convergent numerical solution, we apply the finite difference scheme on layer-adapted moving meshes obtained through mesh equidistribution principle.

Further, we study the simulation of the Navier-Stokes equations in domains with moving boundaries. Arbitrary Lagrangian-Eulerian is used to transform the problem from the moving domain to a fixed reference domain; this is achieved with the help of an artificial domain velocity. To solve the resultant Navier-Stokes equation in the fixed domain, we use the characteristic method. For the interfaces, suitable boundary conditions are used. The proposed method is applied to three different problems and the results are compared with the earlier results.

# **THERMALLY RADIANT WILLIAMSON NANOFUID FLOW OVER A PERMEABLE STRETCHING SHEET WITH VISCOUS DISSIPATION AND JOULE HEATING EFFECTS**



**Eshetu Haile**

Department of Mathematics  
Bahir Dar University, College of Science,  
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The present talk focuses on the study of an incompressible flow of a steady two dimensional electrically conducting thermally radiant Williamson nanofluid over a permeable stretching sheet with viscous dissipation and joule heating effects. The governing partial differential equations are reduced to a couple of nonlinear ordinary differential equations by using suitable transformation equations; these equations are then solved numerically with the use of the conventional fourth order Runge Kutta method accompanied by the shooting technique. Graphical results of the flow, temperature and nanoparticles volume fraction profiles are displayed. Effects of the physical parameters on velocity, temperature, nanoparticles volume fraction, skin friction coefficient and rates of heat and mass transfer are investigated. The results indicate that the velocity ratio parameter enhances the skin friction coefficient, the velocity profile and rate of heat transfer whereas it minimizes the rate of mass transfer. On the other hand, suction/injection parameter reduces both the velocity and temperature profiles but it vigorously enhances the rate of heat transfer. The non-Newtonian parameter fosters the rate of heat transfer whereas it lessens both the velocity and rate of mass transfer of the nanofluid

## LIKELIHOOD RATIO AND PARAMETRIC BOOTSTRAP TESTS FOR ANALYSIS OF VARIANCE UNDER HETEROSCEDASTICITY



**Somesh Kumar**

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We consider the one-way ANOVA model  $X_{ij} = \mu_i + \epsilon_{ij}$ ,  $1 \leq i \leq k, 1 \leq j \leq n_i$ , where  $\epsilon_{ij} \sim N(0, \sigma_i^2)$ , and error variances  $\sigma_i^2$  are unknown and unequal. The likelihood ratio test (LRT) for testing the null hypothesis  $H_0: \mu_1 = \mu_2 = \dots = \mu_k$  against ordered alternative hypothesis  $H_0: \mu_1 \leq \mu_2 \leq \dots \leq \mu_k$  (with at least one strict inequality) is proposed here. The asymptotic LRT test is also studied. Parametric bootstrap is used to estimate sizes of these tests. Convergence of the parametric bootstrap test is discussed. Simulation results show that LRT tests achieve size for  $k = 3; 4; 5$ . For  $k = 3; 4$  power of asymptotic LRT (ALRT) becomes significant as sample size increases. The robustness of the LRT and asymptotic tests is also investigated here. Five non-normal distributions (t-distribution, Laplace, Exponential, Weibull and log normal) are considered. It is observed that the tests are more robust for large sample sizes. A practical example is provided to illustrate the application of these tests.

We also consider testing procedure for the main effects of One-Way ANOVA model with exponential error distribution that is when  $\epsilon_{ij} \sim \exp(0, 1/\sigma_i)$ , where scale parameters  $\sigma_i$ 's are unknown and unequal. Here we have considered two cases:

(i) testing  $H_0: \mu_1 = \mu_2 = \dots = \mu_k$  against  $H_1$ : at least one inequality and (ii) testing  $H_0: \mu_1 = \mu_2 = \dots = \mu_k$  against ordered alternatives that is testing  $H_0: \mu_1 \leq \mu_2 \leq \dots \leq \mu_k$  with at least one strict inequality. For (i) and (ii) parametric bootstrap test is proposed based on likelihood ratio test procedure. In case (i) after calculating power by taking different configurations of  $\mu_i$ 's for different values of  $\sigma_i$ 's and different sample sizes  $n_i$ 's, it has been observed that when  $k = 3$ , the size of the test is close to nominal level for all the configurations. The size of the test for  $k=4$  is conservative. Power behaviour of the test is also studied. In case (ii) when sample size is small, size of the test is liberal. As sample size increases size of the test becomes close to the nominal level. That is the proposed test is significant for large sample sizes. Also as sample sizes increase power increases and the power decreases when variances increase, while rest of the parameters remain unchanged. Power increases when difference between the means  $\mu_i$ 's increases. Power comparison is done with an earlier test which is used for a specific case of scale parameters. Simulated power of the parametric bootstrap test show that the proposed parametric bootstrap test has more power.

This is joint work with Anjana Mondal (IIT Kharagpur) and Prof. Markus Pauly (TU Dortmund, Germany)

## **THE ROLE OF ANALYTICAL METHODS TO SOLVE THE FALKNER-SKAN DIFFERENTIAL EQUATION**



**Emran Khoshrouye Ghiasi**

Department of Mechanical Engineering  
Young Researchers and Elite Club,  
Mashhad Branch, Islamic Azad University, Mashhad, Iran  
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In this presentation, two analytical methodologies i.e., homotopy analysis method (HAM) and truncated homotopy analysis method (tHAM) are briefly discussed. In general, analyzing the potential flow of fluid past a wedge is described by the well-known Falkner-Skan differential equation. In this way, the flow of fluid is governed through the partial differential equations (PDEs) which are reduced to the ordinary differential equations (ODEs). It is shown that both HAM and tHAM agree very well with those numerical and semi-analytical findings available in the open literature.

# **ABSTRACTS**

**EMEA-AM-01**  
**Linear fuzzy nabla volterra integral equations**  
**on time scales**

**B. Suneetha, G. Suresh Kumar\*, Ch. Vasavi, T.Srinivasa Rao**

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**Abstract:**

In this paper, we present the solutions to first-order linear fuzzy nabla Volterra integral equations on time scales (LFNVIETs) with the help of nabla derivatives. We establish a one-to-one correspondence between the solutions of fuzzy nabla Volterra integral equation and fuzzy nabla dynamic equations on time scales under first-type and second-type nabla derivatives.

***Keywords:*** *Fuzzy sets, fuzzy integral equations, first-type and second-type nabla derivatives. time scales.*



**EMEA-AM-02**  
**On analytical solution for one-dimensional heat  
equation with fuzzy functions under granular  
differentiability**

**S. Nagalakshmi, G. Suresh Kumar\*, T.Srinivasa Rao, Ch. Vasavi**

*Department of Mathematics, Koneru Lakshmaiah Education Foundation,  
Green Fields, Vaddeswaram, Guntur, A.P., India-522502  
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**Abstract:**

In this paper, we have investigated the fuzzy separation of variables method to obtain an analytical solution of a one-dimensional heat equation with fuzzy functions under granular differentiation. The solution of the one-dimensional heat equation with fuzzy functions taken as the product of two fuzzy functions and apply scheme of method of separation of variables under granular differentiability. We present an example to illustrate the method.

***Keywords:*** *Granular differentiability, fuzzy partial differential equation, fuzzy separation of variables method.*

**EMEA-AM-03**  
**A NOTE ON JACOBSAN RADICALS IN SPECIAL BOOLEAN**  
**LIKE RINGS**

**K.Pushpalatha<sup>1</sup>, M.Babu Prasad<sup>2</sup>**

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**Abstract:**

In this paper we endure the learning of Special Boolean-like rings(BLR) . In segment 1 we debate the assets of a Special Boolean-like ring. If  $R$  is a commutative ring with unity , we verify that  $R$  is a Special BLR allowing that  $R$  is a BLR. Further we display that a Special BLR is regular  $\Leftrightarrow$  it is a BR. A method is given to construct special Boolean rings from Boolean rings and certain modules over them. In section 2 we prove that a Special Boolean-like ring  $R$  is a subdirect product of a family of rings  $\{R_i\}$ , somewhere individually  $R_i$  is either a two element field or a four element Boolean-like ring  $H_4$  or a zero-ring. In section 3 we discussed nearby the Jacobson radical  $J(R)$  of a Special BLR  $R$  and demonstrate that  $J(R) = N(R)$  , where  $N(R)$  is the nilradical of  $R$ . As a moment of this, we illustration that every BR is semi simple. Finally we demonstrate that every special BLR which is semisimple, is a Boolean ring.

**Keywords:** *Boolean ring, Boolean like ring, special Boolean like ring, Jacobson Radical*

# EMEA-AM-04

## A STUDY ON BOOLEAN LIKE ALGEBRAS

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### **Abstract:**

The idea of Boolean ring has been generalized in a variety of ways by several Mathematicians . Von-Neumann regular rings, p-rings,  $p^k$ -rings, Boolean-like rings , Associative rings and  $P_1$ &  $P_2$ -rings are a few interesting ring theoretic generalizations of Boolean rings. Boolean-like rings developed by A.L.Foster [2] preserve and confirm to the formal properties of the Boolean ring. V. Swaminathan studied the structure of Boolean-like rings and established new results regarding Boolean-like rings besides extending many of the results true for Boolean rings to Boolean-like rings. The concept of Boolean-like algebra is introduced. It is proved that a Boolean-like algebra is a Boolean algebra if and only if  $a \wedge a = a$  for all  $a$ . Some results pertaining to the mutual implications of Boolean-like algebra and Boolean-like ring are presented in this paper. As in the case of Boolean algebra and Boolean ring, it is proved that the Boolean-like algebra and Boolean-like ring are equivalent abstract structures.

**Keywords:** *Boolean algebra, Boolean like algebra, Boolean ring, Boolean algebra*

# **EMEA-AM-05**

## **Impact Of Covid-19 On Indian Economy**

**Dr. Ankita Tiwari**

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Koneru Lakshmaiah Education Foundation Greenfields, Vaddeswaram(A.P.) India

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### **Abstract:**

The already struggling Indian economy with lower GDP growth rates and substantial unemployment rates has faced yet another unprecedented shock due to the Covid-19 outbreak. The four stages of continued countrywide lockdown spanning over two months in conjunction with global slowdown and considerable interruption in the demand-supply chain has dented the economy deeply. The severity of the economic downturn will depend on the nature and duration of the ongoing lockdown, the gravity of the pandemic and the mannerism in the exit plan associated with the upliftment of the lockdown.

The article discusses gives an overview of the Covid-19 situation in India, Indian economy before the pandemic, its impact on different sectors and the policy recommendation and strategies designed by the government to lower the financial crisis.

***Keywords: Indian economy, Covid-19 pandemic.***

**EMEA-AM-06**  
**A study of common fixed point in intuitionistic fuzzy  
metric space with weakly compatible mapping**

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**Abstract:**

Sintunavarat and Kumam [19] defined the notion of (CLRg) property which is more general than (E.A) property. The aim of this paper is to prove a common fixed point theorem for a pair of weakly compatible mappings in intuitionistic fuzzy metric spaces employing (CLRg) property. Our results improve and generalize several previously known fixed point theorems of the existing literature.

***Keywords:*** *Intuitionistic fuzzy metric space, property (E.A), common limit range property, weakly compatible Mappings, fixed point.*

## EMEA-AM-07

# Forecast and trend analysis of gold prices in India using Auto Regressive Integrated Moving Average model

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### Abstract:

Autoregressive Integrated Moving Average (ARIMA) is one of the powerful statistical method to forecast the timeseries data. Forecasting plays a key role in estimating the future prices. Keeping in view that we have selected the prices of Gold in India from 1964 to 2019 through different secondary sources. Many factors are responsible for rise of gold price in India such as traditional demand, no liability on the investors, inflation proof, low interest rate on most of the saving schemes, safe investment tool. In the present study we mainly focused on estimating the prices of Gold from the year 2020 to 2029, observed the sudden increase of gold price in 2020 due to various reasons and its impact on forecasting prices of gold using ARIMA model. Identifying the suitable ARIMA model (0,2,3) by conducting the analysis of Autocorrelation function (ACF) and Partial autocorrelation function (PACF) to the selected differenced series and present the forecasting prices of gold. The selected secondary source data exhibits the positive trends for the quantitative analysis.

**Keywords:** *Autoregressive integrated moving average (ARIMA); prices of gold; auto correlation function; trend analysis.*

# EMEA-AM-08

## Diagnostic Analysis of Diabetes Mellitus using Machine Learning Approach

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Diabetes is the most dangerous chronic disease that could lead to other severe complicated conditions. To prevent these complications, we manifest the machine learning techniques to extract knowledge on each difficult risk factors that become crucial. This research aims to find the prediction model for diabetes occurrence and show the significant features correlated with it. Machine Learning is a sub-part of Artificial Intelligence that can provide diagnosis and prognosis. The proposed research focuses on the diagnosis of diabetes mellitus to make a decision support system. The methodology analyses the data with machine learning techniques such as Extreme Gradient Boosting, Decision Tree, Logistic Regression, Naive Bayes, K- Nearest Neighbor, and Random Forest for predicting diagnosis. Our proposed research observed the experimental results from the parameter indices and proves that Extreme Gradient Boosting and Decision Tree had the highest accuracy to determine the diagnosis of diabetes, with 88.2% and 85.3%, and the Naive Bayes algorithm shows the least performance with 75.3%.

***Keywords: Artificial Intelligence, Machine Learning, decision support system, prediction Model, Accuracy.***

**EMEA-AM-09**  
**Integrability conditions of Volterra integro-dynamic matrix systems with resolvent kernals on time scales.**

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**Abstract:**

In this work, we study linear Volterra matrix systems with periodic coefficients on delta settings which unifies both discrete and continuous dynamical systems. Further we extend the concepts to a mixture of discrete and continuous parts also known as hybrid dynamical systems. We develop the solution of the Volterra integro dynamic matrix system and integrability conditions of Volterra integro-dynamic matrix systems with resolvent kernals.

***Keywords: Floquet theory, Volterra integro-dynamic, Resolvent kernals, Kronecker roduct***



**EMEA-AM-10**  
 **$\Psi$ - stability and  $\Psi$ - uniform stability of periodic linear  
Sylvester matrix dynamical system on time scales**

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**Abstract :**

In this paper, we develop the  $\Psi$ - stability and  $\Psi$ - uniform stability on time scales for trivial solutions of periodic linear Sylvester dynamical system. We derive a necessary and sufficient condition for  $\Psi$ - stability and  $\Psi$ - uniform stability for trivial solutions of periodic linear first order non-homogenous dynamic equation on time scales. Applying the technique of Kronecker product of matrices, Finally establish  $\Psi$ - stability and  $\Psi$ - uniform stability for trivial solutions of periodic Sylvester matrix dynamical system on time scale  $T_+$ .

***Keywords: Periodic , Matrix Sylvester Systems, time scales, variation of parameters, Kronecker Product.***

## EMEA-AM-11

# Characterizations of Interval-Valued intuitionistic fuzzy Commutative hyper BCK-ideals of hyper BCK-algebras

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### **Abstract:**

The intuitionistic fuzzification of commutative hyper BCK-ideals of hyper BCK-algebras is introduced and related properties are investigated. Then we present some theorems which characterize the above notions according to the interval-valued level subsets. Also we obtain the relationship among these notions, interval-valued intuitionistic fuzzy (strong, weak, reflexive) hyper BCK-ideals and interval-valued intuitionistic fuzzy commutative hyper BCK-ideal and investigate some interesting properties.

**Keywords:** *Hyper BCK-algebra, Interval-valued intuitionistic fuzzy commutative hyper BCK-ideal.*

**EMEA-AM-12**  
**Characterizations of Interval-valued intuitionistic fuzzy**  
**Positive implicative hyper BCK-ideals of hyper**  
**BCK-algebras**

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**Abstract:**

In this paper, we prove some theorems which characterize the notions of IVIFHBI's and Interval-valued intuitionistic fuzzy positive implicative hyper BCK-ideals (IVIFPIHBI's) of types-1,2,3 and 4 of hyper BCK-algebras. Also, we investigate the relationship between these notions and some of related properties are investigated.

**Keywords:** *Hyper BCK-algebra (HBI), Interval-valued intuitionistic fuzzy hyper BCK-ideals (IVIFHBI's) and Interval-valued intuitionistic fuzzy positive implicative hyper BCK-ideals (IVIFPIHBI's) of Types 1,2,3,4.*

# EMEA-AM-13

## Reinvestigation on assessing the stability of Mullagulov tested steel rods under follower forces

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### **Abstract:**

Dynamic instability is an interesting topic in the mechanics of elastic structures. Though the subject has formed by a large number of analytical, numerical and experimental investigations, it has many issues as evidenced from the critical overview of Elishakoff. The controversial articles of Koiter and Sugiyama on unrealistic and realistic follower forces demand experimental verification. Mullagulov has proposed a device for creating the follower forces and tested steel rods under compression. This paper highlights briefly on the experimentation of Mullagulov and his observations to examine the influence of material properties on the stability load estimations and to confirm the practical realization of follower forces.

**Keywords:** *Beck column, tip-concentrated tangential load, critical load parameter, coalescence Frequency parameter*

# EMEA-AM-14 NEW INFERENTIAL PROCEDURES FOR NONLINEAR MODELS

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## **Abstract:**

A model may be considered a mathematical description of a physical, chemical or biological state or process. Many models used in Applied Mathematics and Mathematical Statistics are nonlinear in nature. In Statistics, nonlinear regression is a form of regression analysis in which observational data are modeled by a function which is a nonlinear combination of the model parameters and depends on one or more independent variables. The data are fitted by a method of successive approximations. One of the major topics in the literature of Theoretical and Applied Mathematics is the estimation of parameters of nonlinear regression models. A perfect model may have too many parameters to be useful. Nonlinear regression models have been intensively studied in the last three decades. In this research article, an attempt has been made by developing some new inferential techniques for estimating parameters and testing nonlinear hypotheses on them of nonlinear regression models. Moreover a new test for the problem of heteroscedasticity in nonlinear regression model has been derived by using iterative NLLS internally studentized residuals

***Keywords:*** *Nonlinear regression model, Heteroscedasticity, Studentized residuals, Parametric vector, Nonlinear least squares (NLLS) estimator*

# EMEA-AM-15

## A study on sum of positive integral powers of positive integers

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### **Abstract:**

Sums of powers of positive integers have been of interest to mathematicians since antiquity. Over the years, mathematicians in various places have given verbal formulas for the sum of the first  $n$  positive integers, the sum of the squares of the first  $n$  positive integers, the sum of the cubes of the first  $n$  positive integers, and so on. Beginning as early as the tenth or eleventh century, general methods existed. However, since each sum depended on the sums of the lower powers and required extensive new calculation, often done entirely verbally, in practice, these general methods did not result in calculation of formulas for sums of very high powers. This research article mainly focuses on the derivation of generalized result of this sum. More explicit formula has been derived in order to get the sum of any arbitrary integral powers of first  $n$ -natural numbers. Furthermore by using the fundamental principles of Combinatorics and Linear Algebra an attempt has been made to answer an interesting question namely: Is the sum of integral powers of natural numbers a unique polynomial? As a result it is depicted that this sum always equals a unique polynomial over natural numbers. Moreover some properties of the coefficients of this polynomial are derived. More importantly a recurrence relation which can give the formulas for sum of any positive integral powers of first  $n$ -natural numbers has been proposed and it is strongly believed that this recurrence relation is the most significant thing in this entire discussion

**Keywords:** *Lower triangular matrix, Full rank, Simultaneous non-homogeneous linear equations.*

# EMEA-AM-16

## Math behind the mysterious number 6174

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### **Abstract:**

At first glance, the number 6174 looks like any other number plucked from thin air. Perhaps this is what makes this unassuming number so remarkable. In 1949, Indian mathematician D. R. Kaprekar, discovered the mysterious beauty of 6174 after devising a process that we now know as Kaprekar's operation. The main goal of this research article is to chase the mystery behind the fourth order Kaprekar constant 6174 using the fundamental principles of Combinatorics and Linear Algebra and to hunt the other ordered Kaprekar constants. Kaprekar constant 6174 has been an interesting one with its own mystery for decades in the research field of Analytical Number Theory. Many recreational and experimental Mathematicians have been studying this number for decades. In this research paper an attempt has been made to trace the mystery behind that Kaprekar constant 6174 and other Kaprekar constants of all orders. The method discussed here ensures a way to trace Kaprekar constants of any order. Furthermore the proof of the existence and uniqueness of third order Kaprekar constant has been proposed and this proof can be implemented to find the Kaprekar constants of any order if they exist.

***Keywords: Convergence, Kaprekar Process, Kaprekar Constant, Derrangements, NHLE, Bijection, Gauss-Jordan Method, Augmented Matrix, Rank, Echelon Matrix***

# EMEA-AM-17

## Bipolar-Fuzzy Graph of Semigroup

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### **Abstract:**

The main objective of this paper is to connect bipolar fuzzy theory and graph theory with an algebraic structure semi-group. In this paper, we introduce the notion of bipolar fuzzy graph of semigroup, the notion of isomorphism of bipolar fuzzy graphs of semi-groups, the notion of regular bipolar fuzzy graph of semigroup and the notion of anti- bipolar fuzzy ideal graph of semigroup as a generalization of anti- bipolar fuzzy ideal of semigroup, bipolar fuzzy graph and graph. We study some of their properties and prove that  $G(V_1, A_1, B_1, \mu_{A_1}, \sigma_{B_1})$  and  $G(V_2, A_2, B_2, \mu_{A_2}, \sigma_{B_2})$  be bipolar fuzzy graphs of semigroups are isomorphic if and only if their complements are isomorphic.

**Key words:** *Bipolar-Fuzzy sets, Semigroup, Graph, and Bipolar fuzzy graph, Anti fuzzy ideal.*



**EMEA-AM-18**  
**On Chromatic Number of a Bi-polar Fuzzy Complete  
Bipartite Graph**

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**Abstract:**

The ultimate objective of a piece of research work is to present the labeling of vertices in 3-PFG and labelling of distances in 3-PFG. Also we characterize some of its properties. Later, we define the vertex and edge chromatic number BF- Complete Bipartite graph. Further we illustrated an example for BFRGS which represents a Route Network system.

***Key words: 3-polar-Fuzzy Graphs, Regular Graph, Labelling Graph, Chromatic number, Complete Bipartite graph.***

**EMEA-AM-19**  
**An Ideal Line on Client's Procurement Purpose in the  
direction of Store-Brands in Contemporary Trade  
Establishments**

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**Abstract:**

Over the last few decades, the world of transaction has understood a wonderful modification. Today, trade industry reached altogether new heights. It is seeing an extraordinary change. Financial collapse coupled with industrial developments is reforming the trade landscape faster. Today, buyer potentials of goods and services, their perceived value and location today, are almost totally different and comparatively more progressive than those of clients of five years before. Such tasks are affectation hazard to certain stores while certain other stores are finding novel openings out of it. Above all, trade industry throughout the globe is going to witness an action-packed, affected chapter.

In this linking, it is felt imperious to conduct a study on clients' purchase intention on brand of stores of various national retail chains. The study tries to explore clients' procurement purpose towards store brands in Andhra Pradesh, the newly appeared state after splitting from Telangana in 2014.

**Keywords:** *Sample Design, Sampling Frame, Sample Size, Reliability, Chi-square, Shopping Frequency, Modern Retailing.*

# EMEA-AM-20

## Logical Learning Of Several Dominations On Bipolar Fuzzy Graphs

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### **Abstract:**

Dominating sets have a vital function regarding of fuzzy graph theory. Traveling salesman problem, communication network, traffic route problem are largely discussed applications among the diverse applications dealing with the theory of dominations. In this paper we exposed various types of dominations on Bipolar fuzzy graphs such as Strong Dominations, Split and non-split dominations, Multiple dominations and some applications of Bipolar fuzzy graphs.

***Keywords: Bipolar fuzzy graph, order and size of BFG, Bipolar bridges, Strong Bipolar fuzzy graph, Total domination on fuzzy graphs, Split and non-split domination on bipolar fuzzy graphs.***

**EMEA-AM-21**  
**Some Basic operations on GAMMA**  
**Neutrosophic set with different approach**

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**Abstract:**

In this paper we discuss some important basic operations on  $\Gamma$  -Neutrosophic set with different approach. We define  $\Gamma$  -Neutrosophic set, sub set, union and intersection of two  $\Gamma$  -Neutrosophic sets, Truth favorite and falsity favorite of  $\Gamma$  -Neutrosophic sets and distance measures of  $\Gamma$  -Neutrosophic sets with suitable examples and some important propositions.

***Key words:  $\Gamma$  - Neutrosophic set, Truth favourite, falsity favourite, Similarity measure.***

**EMEA-AM-22**

## **A Study on Fundamentals of $\Gamma$ - Soft set Relations**

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**Abstract:**

Soft set theory proposed by Molodtsov, it has been regarded as an effective Mathematical tool to deal with uncertainties. In this paper we studied the  $\Gamma$ - soft set relations,  $\Gamma$ - soft sub set relation, inverse  $\Gamma$ - soft set relation, different types of relations on  $\Gamma$ - soft set,  $\Gamma$ - soft set functions and some fundamental results are carried out.

***Keywords:***  $\Gamma$ - soft set relation,  $\Gamma$ - soft sub set relation, inverse  $\Gamma$ - soft set relation,  $\Gamma$ - soft setfunction

**EMEA-AM-23**  
**Interval Integro Dynamic Equations On Time Scales**  
**Under Generalized Hukuhara Delta Derivative**

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**Abstract:**

This paper is devoted to study the local existence and uniqueness results for interval valued integro-dynamic equations on time scales (IIDETs) using Banach contraction principle under generalized delta derivative ( $\Delta$ g-derivative).

**Keywords:** *Interval valued dynamic equations, Time scales, Generalized Hukuhara delta derivative.*

**EMEA-AM-24**  
**ON THE  $\Psi$ -CONDITIONAL EXPONENTIAL ASYMPTOTIC**  
**STABILITY OF LINEAR MATRIX DIFFERENCE EQUATION**

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**Abstract:**

In this paper we develop the if and only if condition for  $\Psi$ -conditional exponential asymptotic stability of zero solution of the linear matrix difference equation, by using the concept of Kronecker product of matrices.

**Keywords:** *Fundamental matrices,  $\Psi$ -conditional exponential stability, kronecker product of matrices*

**EMEA-AM-25**  
**Bilateral Generating Relations Associated with Two  
Variable Generalized Hypergeometric Polynomials**

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**Abstract:**

In this paper, the authors first prove a theorem on bilateral generating relations for a certain two-variable generalized hypergeometric polynomials  $R_n(\beta; \gamma; x, y)$  by the group-theoretic technique is introduced by Weisner. It is then shown how the main result can be applied to derive a large variety of bilateral generating functions for various special functions, as well as for their various generalizations. Some results given by other researchers are thus observed to follow easily as special cases of the theorem proved in this paper. It is worth noting that special functions play role in the design of filters and approximation theory in communication engineering

**Keywords:** *Bilateral Generating Relations, Hypergeometric Polynomials, Special Functions*



# EMEA-AM-26

## Chebyshev Polynomials Generating Functions By Weisner Method

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### Abstract:

This paper attempts to obtain generating functions for the Chebyshev polynomials  $T_n(x)$  (special ultra spherical polynomials of the first kind) using Weisner's group-theoretic method by interpreting 'n' suitably. It is possible to derive at least three generating relations for various special functions of mathematical physics using this method introduced by Louis Weisner. In approximation theory, the roots (nodes) of  $T_n(x)$  are used as matching points for optimizing polynomial interpolation. Chebyshev polynomials are also used in many models to study them elegantly, including filters in signal processing distributed networks.

**Keywords:** *Chebyshev Polynomials, Generating Functions, Group-Theoretic Method*

**EMEA-AM-27**  
**Optimal Control Policy for a Two-Phase M/M/1**  
**Unreliable Gated Queue Under N-Policy with a Fuzzy**  
**Environment**

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**Abstract:**

The paper presents a controllable two-phase service single server Markovian gated queue with server startup and breakdowns under an N-policy, where the queue parameters arrival rate, startup rate, batch service rate, individual service rate, breakdown rate, repair time, and cost elements are all fuzzy numbers. We create parametric nonlinear programming problems to determine the upper and lower bounds of the least total anticipated cost per unit time at the possibility level using Zadeh's extension concept and  $\alpha$ -cuts. By treating the system parameters and cost elements as trapezoidal fuzzy numbers, numerical values for the lower and upper limits of the optimum threshold N and the minimal total anticipated cost per unit time are obtained using MATLAB to solve nonlinear programming problems.

An analytical article looks at a controlled two-phase service single server Markovian gated queue with server startup and breakdowns under N-policy. All queue parameters in this study are fuzzy numbers. It is created using Zadeh's extension concept and the  $\alpha$ -cuts to discover the upper and lower bounds of the minimal total anticipated cost per unit time for each alternative. The lower and upper bounds for the optimal threshold N and the minimal total anticipated cost per unit time are obtained by solving the nonlinear programming problems using MATLAB using trapezoidal fuzzy numbers.

**Keywords:** *N-Policy, Two-phase, Unreliable server, Fuzzy sets, Zadeh's extension principle, Trapezoidal fuzzy number, Nonlinear programming problem.*

# EMEA-AM-28

## Optimal Control For A Two-Phase Service Single Server Morkovian Queue Under N-Policy With A Fuzzy Environment

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### Abstract:

In this paper a controllable two-phase service M/M/1 queue under N-policy in which the queue parameters arrival rate, batch service rate, individual service rate, vacation rate and cost elements are all fuzzy numbers. Based on the  $\alpha$ -cuts and Zadeh's extension principle, parametric nonlinear programming problems are developed to find the upper bound and lower bound of the minimum total expected cost per unit time at the possibility level. By considering the system parameters and cost elements as trapezoidal fuzzy numbers, numerical values for the lower and upper bounds for the optimal threshold  $N$  and the minimum total expected cost per unit time are computed by solving the nonlinear programming problems through MATLAB.

**Keywords:** *N-Policy, Two-phase, Fuzzy sets, Zadeh's extension principle, Trapezoidal fuzzy number, Nonlinear programming problem*

**EMEA-AM-29**  
**Cartesian Product on Bipolar Fuzzy  $d$ -ideals and Bipolar  
Anti Fuzzy  $d$ -ideals of a  $d$ -algebra**

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**Abstract:**

In this paper, we introduce and study the concept of cartesian product of bipolar fuzzy sets of a  $d$ -algebra  $X$  and we characterize bipolar fuzzy subalgebra, bipolar fuzzy  $d$ -ideal, bipolar anti fuzzy  $d$ -ideal of  $X$  in terms of cartesian product of bipolar sets of  $X$ .

**Keywords:** *bipolar fuzzy set, bipolar fuzzy subalgebra, bipolar fuzzy  $d$ -ideal, bipolar anti fuzzy  $d$ -ideal.*

**EMEA-AM-30**

# **Bipolar fuzzy Translation, Multiplication, Extension of Bipolar anti fuzzyd-Ideals of d-Algebra**

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## **Abstract:**

In this paper, we introduce and study the concept of a bipolar fuzzy translation, bipolar fuzzy extension, and bipolar fuzzy multiplication of a bipolar fuzzy set on bipolar anti fuzzy  $d$ -ideals. Also, we prove that the bipolar fuzzy translation (resp. extension, multiplication) of a bipolar anti fuzzy  $d$ -ideal of a  $d$ -algebra is a bipolar anti fuzzy  $d$ -ideal.

**Keywords:** *bipolar fuzzy set, bipolar anti fuzzy  $d$ -ideal, bipolar fuzzy translation, bipolar fuzzy multiplication.*

**EMEA-AM-31**  
**The Sensitivity Analysis of Service and Waiting Costs of a  
Multi Server Queuing Model**

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**Abstract:**

Queuing theory deals with waiting lines and queues which usually appear at the service providers. Some innovative results regarding the probable number of customers, the probable waiting time in the system and in the queue, service and waiting costs can be obtained by applying multi server queuing model. This research article explores the sensitivity analysis between waiting cost of consumer and service cost of service provider.

**Key Words:** *M/M/S Queuing model, Waiting lines, Number of servers, Expected waiting cost, Expected service cost, Service provider, Consumer, Sensitivity analysis.*

**EMEA-AM-32**

# **The statistical Analysis of Multi server Queuing Model to Optimize Health Care Performance**

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## **Abstract:**

This research aims to provide the statistical analysis of the expected service and waiting costs to optimize the service level of multi server queuing model and also provide suggestions on the best strategy to get better the performance of the system so that can capitalize on the efficiency of resource. TORA optimization used software to analyze the data. The result of the analysis illustrates that the optimal server level at a minimum total cost.

**Key Words:** *M/M/S Queuing model, Waiting lines, Number of servers, Expected waiting cost, Expected service cost, Service provider, Consumer, Sensitivity analysis.*

# EMEA-AM-33

## Multi Anti Fuzzy Ideals of $\Gamma$ - near ring

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### **Abstract:**

Multi fuzzy set theory is an extension of fuzzy set theory. In this paper, we define the multi fuzzy ideals of  $\Gamma$  - near ring and level sets of AUB and investigated some related properties. Also, we define multi anti fuzzy ideals of  $\Gamma$  - near ring and verified some allied properties. This notion of multi anti fuzzy ideals of a  $\Gamma$  - near ring is a generalization of the theory of anti fuzzy ideals in  $\Gamma$  - near rings.

**Keywords:** *Fuzzy set, multi fuzzy set, fuzzy  $\Gamma$  - near ring, multi fuzzy  $\Gamma$  - near ring, multi fuzzy ideals, multi anti fuzzy ideals, level sets, anti level sets ,cartesian product, anti product .*



**EMEA-AM-34**

## **MULTI FUZZY IDEALS OF A I-NEAR RING**

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### **Abstract:**

In this paper we give a brief survey of the development of multi fuzzy sets which is an extension of fuzzy sets . We define the multi fuzzy ideals of l near ring. Also, in this paper we study the Aggregation norm operation on multi fuzzy ideals of a l near ring . Also some related properties of a l near ring are established. Also we define  $h A \cup B$  ,  $h A \cap B$ . The purpose of this study implements the fuzzy set theory and l - near ring theory in multi fuzzy sets.

**Keywords:** *Multi Fuzzy, Aggregation norm, Multi Fuzzy ideal.*

## EMEA-AM-35

# Finite Integrals involving the Psi-function, the logarithm function and elliptic integral

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### Abstract:

A new function, named as Psi-function has been considered in the present research article. We give a finite integrals with the elliptic integral of the first species, the logarithm function and the Psi-function. Finally, we discussed several particular cases and remarks.

**Keywords:** *Elliptic integrals of first species, H-function, I-functions, logarithm function, Psi-function*

# EMEA-AM-36

## Finite Automata Model for SEIHRD Epidemic Model Of COVID-19

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### Abstract:

Epidemics is a critical vicinity of situation for all living beings in the world. If we no longer cope with a pandemic situation in a right manner, it cannot be controlled and it results in a disaster as huge quantity of human population is concerned. Here we evolve a non-deterministic finite automata (NFA) for the Susceptible-Exposed-Infectives-Hospitalized-Recovered-Death (SEIHRD) model for computational purpose. Through this version we could show there will be certain languages which can be regular in epidemic model of automata since it is able to be compared with the languages which are normally regular, for which we are able to have NFA. We made an attempt to expose how the epidemic model could behave in order that we may better broaden our methods that could tackle this epidemic scenario. The objective of this work is to find a computation model in terms of nondeterministic finite automata (NFA) by which we may better infer the pandemic environment.

**Keywords:** *Epidemic, Pandemic, COVID-19, SEIHRD epidemic model, Epidemic NFA.*

**EMEA-AM-37**

## **Elzaki Transform for Two Tank Mixing Problems**

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### **Abstract:**

Integral transform method is a powerful method which is widely used to solve the several kinds of differential equations with initial or boundary conditions. The new integral transform method called as Elzaki transform method is useful for solving differential equations, integro-differential equations and also integral equations. This method is also useful for solving nonlinear differential equations; it also provides an effective and efficient way of solving a wide range of problems. In this paper, we have used the Elzaki transform method for solving the two tank mixing problems, which was an application of first order system of linear differential equation.

**Keywords:** - *Elzaki transform, Differential equations.*

**EMEA-AM-38**  
**Integrals involving the Psi-function, the elliptic integral,  
arctan function and Fresnel function**

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**Abstract:**

In the present paper, we use new function called Psi-function defined by Pragathi and Satyanarayana. We give a finite integral with elliptic integral of the first kind, the arctan function. Also we establish the same using Fresnel integral with several particular cases.

**Keywords:** *Arctan function, Elliptical integral of first kind, Fresnel Integral, I-functions, Psi-function.*

**EMEA-AM-39**

## **Forecasting INR/USD Exchange Rates using Hybrid and Neural Network Model**

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### **Abstract:**

Prediction of exchange rates plays a vital role in international trade, stocks and framing the policies of exports and imports. USD exchange rates used widely for many business areas. In this paper an attempt is made to predict INR/USD exchange rates using Hybrid model that joins the forecasts of ARIMA as well as FFNN. The forecasting accuracy of developed models, were tested used the error measures like MAE, MAPE & RMSE. The results shows hybrid model has greater accuracy compared to ARIMA and FFNN model. The predicted exchange rates would vary between 70.80 and 71.39 for the next one month and this variation in exchange rates would help the business people and also for framing the govt policies within the upcoming future.

***Keywords: Exchange Rates, Box Jenkins methods, FFNN, Combined Forecasts, MAE, MAPE, and RMSE.***

**EMEA-AM-40**

## **Organization Politics and Organizational Development through Effective Employees**

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### **Abstract:**

Today's corporate world by and large is influenced with the dissatisfaction, differences and discontent among the employees. They are two dimensions of organization politics i.e., one for positive growth and development and other one is for personal and group gains. Politics is always an informal and unofficial level causing harm and negative growth in the organization. There are a number of variables which by and large influences organizational culture, growth and development. This kind of research is basically based upon qualitative aspects where the researchers need to interact with employees at various levels of different organization with personal interviews, questionnaire to know the ideas of the employees on sensitive issues like organizational politics and organizational development.

***Keywords: Politics, Growth, Development, Culture, Motivation.***

**EMEA-AM-41**  
**MHD Casson Nanofluid flow Containing Gyrotactic Micro-Organisms over an Inclined Porous Stretching Surface with Thermal radiation and Chemical reaction**

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**Abstract:**

The bioconvection phenomenon, through the utilization of nanomaterials, has recently encountered significant technical and manufacturing applications. Bioconvection has various applications in bio-micro-systems due to the improvement it brings in mixing and mass transformation, which are crucial problems in several micro-systems. The present investigation aims to explore the bioconvection phenomenon in MHD Casson nanofluid flow via free convection along an inclined porous stretching surface with useful characteristics of thermal radiation and chemical reaction, constant heat flux and micro-organisms boundary conditions. The flow analysis is addressed based on the Buongiorno model with the integration of Brownian motion and thermophoresis diffusion effects. The governing flow equations are converted into ordinary differential equations by means of appropriate similarity transformation; they were solved numerically using the Runge–Kutta–Fehlberg integration scheme with shooting technique. The influences of all the physical parameters are discussed for skin friction coefficient, Nusselt number, Sherwood number, and density of the micro-organisms number.

***Keywords: MHD Casson nanofluid; gyrotactic micro-organisms; inclined porous sheet; Thermal radiation and chemical reaction.***



**EMEA-AM-42**

**Heat and mass transfer in MHD Casson and Williamson nanofluid flow over an exponentially porous stretching surface**

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**Abstract:**

The present study investigates the rate of heat and mass transfer in MHD Casson and Williamson nanofluid flow over an exponentially porous stretching surface subject to the heat source/sink and mass suction. Mathematically, the existing flow problem has been configured in accordance with the fundamental laws of motion and heat transfer. The similarity transformations have been used to convert the governing equations into the nonlinear ordinary differential equations (ODEs). The numerical solution to the resulting nonlinear ODEs with the associated boundary conditions have been obtained with the utilization of bvp4c package in MATLAB. The behavior of the resulting equations of the problem is checked graphically under the influence of various flow parameters which ensures that the rate of heat transfer decreases with the increase of Brownian motion parameter as well as it increases with the increase of thermophoresis parameter. Moreover, the Sherwood number increases with the rising values of the Prandtl number and Lewis number.

**Keywords:**

*Casson and Williamson Nanofluid, Exponential Porous Stretching Surface; MHD; Radiation; Chemical reaction.*

## EMEA-AM-43

# Impacts of Thermophoresis, Joule heating and Soret & Dufour effects on mixed convective Jeffrey fluid flow over an elongated sheet

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### Abstract:

The Magneto hydrodynamics radiative flow of an in-compressible Jeffrey fluid through porous medium over a linearly stretching sheet is presented. The impacts of thermo-phoresis effects, joule heating and Soret & Dufour effects in the radiative flow have been investigated. Similarity transforms are adopted to obtain the system of ordinary differential equations from the governed system of partial differential equations. The Runge- Kutta –Fehlberg with shooting technique is used to solve reformed ODE numerically. The influences of several pertinent parameters on velocity profiles ( $f'(\eta)$ ), temperature profiles ( $\theta(\eta)$ ) & concentration profiles ( $\phi(\eta)$ ) are studied through several plots. The effect of Deborah number and the permeability parameter on velocity, temperature & concentration profiles having opposite phenomena comparing with retardation times. The values of physical parameters like co-efficient of skin friction, Nusselt number & Sherwood number for several pertinent parameters are tabulated.

**Keywords:** *Thermo-phoresis effect, Porous medium, Joule heating, Soret and Dufour effects, Jeffrey fluid, Skin friction co-efficient, Nusselt number & Sherwood number.*

**EMEA-AM-44**  
**Mixed convective flows on  $Al_2O_3$  – Engine oil nano fluid**  
**under the influence of thermal radiation & magnetic field**  
**over a vertical circular cylinder**

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**Abstract:**

The Present study investigates a vertical circular cylinder immersed in mixed convective fluid and the effect of boundary layer flow over a nano fluid Alumina ( $Al_2O_3$ ) nano particle with engine oil as the base fluid was studied under the impact of magnetic field, thermal radiation with suggested external flow. The radiative heat loss is modelled by Rosseland estimations. The partial differential equations are modified into ordinary differential equations by using similarity variables. The technique of Runge- Kutta –Fehlberg with shooting is used to solve modified ODE numerically. The influences on velocity and temperature contours for Alumina Engine oil nanofluid the nanoparticle volume fraction are obtainable through plots. The impact of various pertinent parameters on velocity and temperatures Profiles are analyzed through numerous plots. The co-efficient of skin friction & Nusselt number for various relevant parameters are calculated and values are tabulated

**Keywords:** *Mixed convection parameter, Magnetic parameter, Nusselt number, Nano particle volume fraction, Prandtl number, Skin friction coefficient and Thermal radiation parameter.*

# EMEA-AM-45

## Influence of Buoyancy effects on MHD Casson fluid over elongated Permeable sheet

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### Abstract:

The main intension of this study is to discover theoretical influence of combined effects of thermal and solutal buyoncy forces of Casson fluid due to porous elongated surface considering thermal radiation, heat source and chemical reaction into account for suction and injection. The elegant R-K fourth order method with technique of shooting is applied to plot the graphs. With the aid of these graphs the influence physical parameters velocity, temperature and concentration are discussed. Velocity of the fluid diminish for Casson parameter, magnetic parameter, permeability parameter and reverse trend is observed thermal Grashof number, solutal Grashof number. Temperature profiles decreases for buoyancy forces and Prandtl number where as opposite behaviour can be observed in all remaining cases. Concentration profiles accelerate for Casson parameter, magentic parameter, permebility parameter, and prandtl number opposite behaviour in remaining cases. Clearly it is observed that the influence of critical parameters on velocity, temaprature and concentration profils attians higher values in the case of injection and lesser values in case of suction. Impact of skin friction, Sherwood and Nusselt numbers on the flow for diverse critical parameters are exposed realistically via graphs.

**Keywords:** *Permeable stretching sheet, Casson fluid, radiative parameter, buoyancy effects, chemical reaction.*

**EMEA-AM-46**

**Influence of thermophoresis and Brownian motion on liquid thin film flow of Casson nanofluid over elongated sheet**

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**Abstract:**

Present investigation aims at analysing the properties of heat and mass transfer phenomena of liquid thin film of Casson Nano fluid over elongated sheet under the influence of thermophoresis and Brownian motion. Variables of similarity were prompted to transmute partial differential equations into dimensionless equations and are resolved numerically by elegant method bvp 4c. Casson Nano fluid film thickness is calculated for different values of critical parameters. The temperature escalates for higher values of Magnetic, Casson, thermal radiation, Brownian motion and thermophoresis parameters, whereas contrary effect with other parameters is observed. Impact of Skin friction, Sherwood and Nusselt numbers on the flow configurations for diverse critical parameters are exposed realistically via graphs. Numerical results that obtained in the current exploration are confirmed with previously explored values in very marginal way.

**Keywords:** *Similarity variables, Magnetic field, Brownian motion, Lewis number, film thickness.*

**EMEA-AM-47**

**MAGNETOHYDRODYNAMIC WILLIAMSON FLUID MOTION  
OVER AN EXPONENTIALLY STRETCHING SHEET WITH  
CHEMICALLY RADIATIVE HEAT SOURCE EFFECTS UNDER  
SUCTION/INJECTION**

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**Abstract:**

In this paper, the attitude priority of this expose is to investigate the scenery of the motion, thermal and mass transport of chemically reacting magneto hydrodynamic Williamson fluid with thermal radiation and heat source over an exponentially stretching surface through suction/injection. Leading equations are evolved and converted to ordinary differential equations using similarity techniques and solved by means of homotopy analysis method (HAM). The character of physical governing parameters on motion of liquid, temperature and concentration are discussed through numerical statistics and plots. Also the friction factor, local heat transport rate and local mass transport rate are premeditated to study the motion behavior at the wall. An association with penetrable grades for exacting cases is establish with remarkable assent.

***Keywords: MHD; Radiation; chemical reaction parameter; heat source; energy and stretchingsheet.***

# EMEA-AM-48

## ENERGY SOURCE IMPACTS ON STEADY CHEMICALLY RADIATIVE JEFFREY LIQUID OVER A SHEET

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### **Abstract:**

This study is the collective impact of energy and momentum transport in Jeffrey fluid over a stretching sheet in the occurrence of energy source/energy sink, thermal radiation and chemical reaction. The surface thermal and the dilution are implicit to vary according to power law form. The foremost PDE equations of our replica are renovated into ODEs by employing similarity variables and then sketched out via HAM technique. Impact of embedding motion factors on motion thermal and momentum have been framed in the brightness of parametric study. The influences of different pertinent parameters are explained through graphs and tables. Favorable comparison with existing literatures has been revealed and it depicts tremendous similarity. It is observed that the flow increases with an increase in Deborah number. Further the thermal is a blow downfunction of Deborah number. Thermal border layer thickness increases by rising the wall thermal and energy source parameters.

***Key words: Jeffrey liquid; Radiation; chemical reaction parameter; energy source; energy and momentum transport.***

**EMEA-AM-49**  
**Unsteady free convection flow of viscous fluids in  
presence of chemical reaction**

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**Abstract:**

This article introduces a theoretical study for unsteady free convection flow of an incompressible viscous fluid. The fluid flows near an isothermal vertical plate. The plate has a translational motion with time-dependent velocity. The objectives of the present study is to investigate the concentration effects on unsteady heat and mass transfer flow of a chemically reacting fluid past a semi-infinite vertical plate with viscous dissipation. The method of the solution can be applied for small perturbation approximation. Results for the concentration are illustrated graphically. The expressions for the concentration fields are obtained. It is observed that as the Schmidt number increases the concentration profiles are to be in the decreasing trend. As we move far away from the plate, whatever may be the value of Schmidt number the profiles are found to converge. It is notice that as the chemical reaction parameter increases the concentration field decreases. It is further notice that at higher values of Schmidt number concentration field profiles converges.

***Keywords: Heat transfer, viscous dissipation, Radiation, Chemical Reaction***



**EMEA-AM-50**  
**FLOW PAST A SEMI INFINITE MOVING VERTICAL**  
**PLATE WITH VISCOUS DISSIPATION**

**Dr. P. Hari Prasad**

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**Abstract:**

The objectives of the present study is to investigate the concentration effects on unsteady heat and mass transfer flow of a chemically reacting fluid past a semi-infinite vertical plate with viscous dissipation. The method of the solution can be applied for small perturbation approximation. It is observed that the profiles are nearly parabolic and converge when  $y = 0$  and at higher value  $y = 10$ . At these places, whatever may be the value of chemical reaction parameter on the concentration field remains constant. It is notice that as Schmidt number increases the concentration field decreases. Further it is notice that as the chemical reaction parameter increases the concentration field effect is found to be absent and the profiles finally converge to zero. It is notice that as the chemical reaction parameter increases the concentration field decreases.

***Keywords: Heat transfer, viscous dissipation, Radiation, Chemical Reaction***

# EMEA-AM-51

## Film Thickness within a Fixed Vertical Circular Cylinder

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### **Abstract:**

The unsteady flow of a elastico viscous fluid of second grade fluid within a circular cylinder has been examined. The nature of the flow and the film thickness has been obtained in terms of modified Bessel functions. The zeros of the modified Bessel functions would give raise to the explicit evaluation of film thickness. The effect of inertia term is only to introduce the exponentially decaying unsteady terms, and may be concluded that the contribution of the inertia term do not qualitatively alter the steady state profiles.

**Keywords:** *Second grade fluid, elastico viscous fluid, rigid boundary*

**EMEA-AM-52**  
**FLOW PAST A SEMI INFINITE VERTICAL POROUS**  
**SURFACE WITH THE EFFECTS OF HEAT AND MASS**  
**TRANSFER”**

**Ch V Ramana Murthy<sup>1</sup>, E. Raghunandana Sai<sup>2</sup>**

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Foundation, Green Fields, Vaddeswaram, A.P., India-522502

<sup>2</sup> Research scholar, Department of Mathematics,  
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**Abstract:**

The problem of the flow past a porous infinite vertically is examined in this article. The contribution of several participating parameters over the flow entities has been analysed in detail. The concentration is demonstrated to be independent from the Schmidt after we leave the bonding surface. It is also noticed that with the increase in the Schmidt number, the temperature decreases. In addition, time parameter helps the temperature. The number and speed of Schmidt is discovered to be reversely related. Also, the mass Grashoff number do not qualitatively alter the nature of velocity profiles.”

***Keywords: Visco elastic Fluid, Magnetic intensity, Porous medium, Heat and mass transfer***

# EMEA-AM-53

## Entropy analysis of nanofluid magnetohydrodynamic convection flow past an inclined surface: A numerical review

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### **Abstract:**

A numerical investigation is conducted to review the entropy study of magneto hydrodynamic (MHD) convection nanofluid flow from an inclined surface. In evaluating the thermo phoresis and Brownian motion impacts, Buongiorno's model is applied to nanofluid transfer. Using Keller's implicit box technique, the governing partial differential conservation equations and wall and free stream boundary conditions are made into the dimensionless form and solved computationally. For different thermos physical parameter values, the numerical results are discussed both graphically and numerically. Verification of the present code with previous Newtonian responses is also included. To analyze the variability in fluid velocity, temperature, nanoparticle volume fraction, entropy, Bejan number, shear stress rate, wall heat, and mass transfer rates, graphical and tabulated results are reported. The study suggests applications in the manufacturing of nanomaterial fabrication, and so on

**Keywords:** *Bejan number, Brinkman number, Buongiorno's nanofluid model entropy generation number, Hartmann number, heat transfer, Keller-box implicit code*

# EMEA-AM-54

## Numerical study of radiative non-Darcy nanofluid flow over a stretching sheet with a convective Nield conditions and energy activation

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### **Abstract:**

Numerous industrial processes such as continuous metal casting and polymer extrusion in metal spinning, include flow and heat transfer over a stretching surface. The theoretical investigation of magnetohydrodynamic thermally radiative non-Darcy Nanofluid flows through a stretching surface is presented considering also the influences of thermal conductivity and Arrhenius activation energy. Buongiorno's two-phase Nanofluid model is deployed in order to generate Thermophoresis and Brownian motion effects [1]. By similarity transformation technique, the transport equations and the respective boundary conditions are normalized and the relevant variable and concerned similarity solutions are presented to summarize the transpiration parameter. An appropriate MATLAB software (Bvp4c) is used to obtain the numerical solutions. The graphical influence of various thermo physical parameters is inspected for momentum, energy and nanoparticle volume fraction distributions. Tables containing the Nusselt number, skin friction and Sherwood number are also presented and well argued. The present results are compared with the previous studies and are found to be well correlated and are in good agreement. The existing modelling approach in the presence of nanoparticles enhances the performance of thermal energy thermoplastic devices.

**Keywords:** *Buongiorno's two-phase Nanofluid model, Arrhenius activation energy, non-Darcy, radiation, magneto hydro dynamics, velocity slip, Biot number.*

**EMEA-AM-55**  
**EFFECT OF PHYSICAL PARAMETERS ON THE FLOW PAST**  
**A SEMI INFINITE MOVING VERTICAL PLATE**  
**WITH VISCOUS DISSIPATION**

**K.V.Chandra Sekhar**

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*Lakshmaiah Education Foundation, Green Fields, Vaddeswaram,*  
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**Abstract:**

The objectives of the present study is to investigate the nature of the velocity field of an unsteady heat and mass transfer flow of a chemically reacting fluid past a semi infinite vertical plate with viscous dissipation. The method of the solution is valid only for small perturbation approximation. Results for the velocity field and the effect of various critical parameters are illustrated graphically. An interesting observation is that, initially as Solutal Grashof number increases the velocity field increases and thereafter as we move far away from the plate a reverse effect is noticed.

***Keywords: Heat transfer, viscous dissipation, Radiation, Concentration.***

**EMEA-AM-56**  
**UNSTEADY MHD FLOW IN A POROUS MEDIUM WITH AN**  
**EXPONENTIALLY DECREASING SUCTION**

**K.V.Chandra Sekhar**

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**Abstract:**

The unsteady state viscous incompressible and electrically conducting fluid through a porous channel when a transverse magnetic field is applied has been studied in this paper. The analysis has been done for the best possible solution. The expressions for various flow entities are obtained and the effect of critical parameters influencing the field equations have been presented analytically and illustrated graphically

***Keywords: Unsteady, MHD, porous medium, Decreasing suction.***

# EMEA-AM-57

## A NOVEL (t,n) THRESHOLD SECRET SHARING SCHEME USING ELLIPTIC CURVE CRYPTOGRAPHY

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### **Abstract:**

Invention of Secret Sharing Scheme by Adi Shamir along with the prevalent advancements offers strong protection of the secret key in communication network. The secret sharing scheme proposed by Shamir is based on Lagrange Interpolation polynomial where the secret  $S$  is divided into  $n$  pieces by a group manager or dealer of the group and distributed among  $n$  participants. A sub group of  $t$  or more participants of the group come together to reconstruct the secret key. Later the cryptanalysis of secret sharing scheme came into picture in the direction of cheater detection whose motivation is to fool the honest participants. The present paper goals to describe a modification to  $(t,n)$  threshold secret scheme using elliptic curve cryptography to avoid the dishonest shareholders and faked shares. In this scheme the group manager or dealer distributes the shares among the participants as affine points on the elliptic curve so that the share modification by the participants or faked shares can be easily detected. Key Words: Shamir Secret Sharing Scheme, Lagrange Interpolation polynomial, Elliptic curve over finite field, Encryption, Decryption

***Keywords: Shamir Secret Sharing Scheme, Lagrange Interpolation polynomial, Elliptic curve over finite field, Encryption, Decryption.***



**EMEA-AM-58**  
**ROTARY OSCILLATIONS OF AN INCOMPRESSIBLE COUPLE**  
**STRESS FLUID GENERATED BY THE TWO CONCENTRIC**  
**SPHERES**

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<sup>1</sup>Associate Professor, Mathematics, Koneru Lakshmaiah Education Foundation, AP, India

<sup>2</sup> Assistant Professor, Bhavan's Vivekananda College of Science & Humanities, Sainikpuri,  
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**Abstract:**

The paper deals with the oscillatory flow of an incompressible couple stress fluid generated by the rotary oscillations of two concentric spheres. The concentric region between the spheres is filled by a couple stress fluid and the two spheres are assumed to oscillate about a common diameter with the same frequency and with different angular speeds. The relevant components of stress tensor and couple stress tensor are obtained and the couple experienced by the spheres is evaluated. The couple is expressed in terms of two quantities  $K$  and  $'K$  and their variation is presented with respect to couple stress parameter and frequency parameter through graphs.

***Key words : Oscillatory flow; Rotary oscillations; Couple stress fluid; Couple.***

# EMEA-AM-59

## SQUEEZE FILM LUBRICATION OF JOURNAL BEARING WITH TEMPERATURE EFFECT

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<sup>2</sup>*Department of Mathematics, Kanchi Mamunivar Government Institute for  
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### **Abstract:**

Thermal effect in hydrodynamic lubrication of journal bearing is studied. It describes a qualitative analysis of system with non-Newtonian incompressible power law lubricants where the consistency of the lubricant varies with pressure and temperature. The governing equation such as equation of motion with continuity and energy equations are solved simultaneously and various bearing characteristics have been discussed and elaborated through figures. It is found that there is significant change in pressure and temperature while non-Newtonian fluid is considered. The important of this paper is highlighted due to non-dimensional scheme for pressure and temperature and consistency with regard to the flow behaviour index  $n$  of the power law lubricant.

**Keywords:** *Hydrodynamic lubrication, Non-Newtonian, Thermal effects, Squeezing.*

**EMEA-AM-60**  
**A semi analytical approach in thermal analysis of  
Hydrodynamic lubrication of journal bearing**

**Venkata Subrahmanyam Sajja<sup>1</sup>, Sudam Sekhar Panda<sup>2</sup>, Dhaneshwar Prasad<sup>3</sup>**

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<sup>2</sup>*Department of Mathematics, Vignan's Foundation for Science Technology  
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<sup>3</sup>*Department of Mathematics, Kanchi Mamunivar Government Institute for  
Post Graduate Studies and Research, Puducherry -605008, India*

**Abstract:**

Hydrodynamic lubrication of journal bearing considering rotation of the journal including the effects of temperature is studied in this work. It describes the theoretical analysis of power law fluid film lubrication of journal. A semi analytical solution is obtained by solving the continuity equation and momentum equation along with thermal energy equation under isothermal boundaries. The obtained results are compared and found that they are in good agreement with the results available in the literature. Further, the delta profile which is the location of the points of zero velocity gradients is also presented in order to get the simplified form the Reynolds and energy equations. The obtained results are compared with the experimental results and seen to be a good agreement with the effect of temperature

***Keywords: Hydrodynamic lubrication, Non-Newtonian, Thermal effects, Squeezing.***

**EMEA-AM-61**

**MHD hybrid nanofluid flow over a porous medium with thermal radiation effect**

**W.Sridhar<sup>1</sup>, G.Vijaya Lakshmi<sup>2</sup>**

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**Abstract:**

Aim to investigate the flow and heat transfer rate of a hybrid nanofluid (Cu-Al<sub>2</sub>O<sub>3</sub>/water) in the presence of MHD and thermal radiation over a porous medium. The hybrid nanofluid has a remarkable feature in enhancing the heat transfer in engineering and industrial applications such as manufacturing, lamination and melt-spinning process, polymer industry etc., By using similarity transformation, the partial differential equations are transformed into a system of linear equations which are then solved numerically by using Implicit Finite difference method. The present study is addressing the problem of MHD flow and heat transfer analysis of a hybrid nanofluid towards over a porous medium with the consideration of the thermal radiation effect. Numerical values of skin friction co-efficient and Nusselt number with different parameters were computed and analysed.

***Keywords: MHD, Hybrid nanofluid, porous medium, Thermal Radiation, Keller Box Method.***

## EMEA-AM-62

# MHD Heat transfer enhancement over exponentially stretching sheet with radiation on a hybrid nanofluid

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<sup>2</sup>Assistant Professor, *Department of Mathematics*, CVR College of Engineering, Engineering, Ibrahimpatnam, Telangana., India-501510  
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### **Abstract:**

The present paper deals with new class of hybrid nanofluid is being used to enhance the heat transfer rate . The hybrid nanofluid have numerous applications in various fields of heat transfer such as medical, transportation ,manufacturing industries etc.The flow and heat transfer induced by an exponentially stretching sheet with hybrid nanoparticles is investigated in this paper. The alumina (Al<sub>2</sub>O<sub>3</sub>) and copper (Cu) nanoparticles are suspended in water to form Al<sub>2</sub>O<sub>3</sub>-Cu/water hybrid nanofluid. In addition, the effects of magnetohydrodynamic (MHD) and radiation are also taken into account. The similarity equations are used to transform the governing equations and their solutions are obtained numerically by adopting Implicit Finite difference scheme which is also known as Keller Box Method. Numerical values of skin friction co-efficient and Nusselt number with different parameters were computed and analysed.

**Keywords:** *Exponentially stretching sheet, Hybrid nanofluid, MHD, Radiation, Keller Box Method.*

**EMEA-AM-63**

**EXISTENCE AND ULAM'S TYPE STABILITY FOR SYLVESTER  
MATRIX IMPULSIVE VOLTERRA INTEGRO-DYNAMIC  
SYSTEM ON TIME SCALES**

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**Abstract**

In this paper, we developed the existence and Ulam's type stability for Sylvester matrix impulsive Volterra integro-dynamic system on time scale calculus. Banach fixed point theorem has used to established these results.

**Keywords:** *stability, matrix impulsive system, time scale calculus, fixed point theorem*

**EMEA-AM-64**

**A NOVEL (t,n) THRESHOLD SECRET SHARING SCHEME  
USING ELLIPTIC CURVE CRYPTOGRAPHY**

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Andhra Pradesh, India

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**Abstract**

Invention of Secret Sharing Scheme by Adi Shamir along with the prevalent advancements offers strong protection of the secret key in communication network. The secret sharing scheme proposed by Shamir is based on Lagrange Interpolation polynomial where the secret  $S$  is divided into  $n$  pieces by a group manager or dealer of the group and distributed among  $n$  participants. A sub group of  $t$  or more participants of the group come together to reconstruct the secret key. Later the cryptanalysis of secret sharing scheme came into picture in the direction of cheater detection whose motivation is to fool the honest participants. The present paper goals to describe a modification to  $(t,n)$  threshold secret scheme using elliptic curve cryptography to avoid the dishonest shareholders and faked shares. In this scheme the group manager or dealer distributes the shares among the participants as affine points on the elliptic curve so that the share modification by the participants or faked shares can be easily detected.

**Key Words:** Shamir Secret Sharing Scheme, Lagrange Interpolation polynomial, Elliptic curve over finite field, Encryption, Decryption

**EMEA-AM-65**  
**SYMMETRY ANALYSIS OF THE MOST GENERAL TIME-  
DELAYED LINEAR SECOND ORDER DIFFERENTIAL  
EQUATION**

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**Abstract**

In this paper, we obtain the equivalent symmetries of second order linear differential equations with variable coefficients and the most general nonlinear delay. Following a completely different approach from the existing Lie Backlund operator method to obtain the determining equations, we develop a Lie type invariance condition using Taylor's theorem for a function of several variables. The determining equations are split to obtain an over determined system of partial differential equations which are then solved to obtain the symmetries of the delay differential equation.

**Keywords:** *Delay differential equations; determining equations; invariance; Lie groups; symmetries.*



**EMEA-AM-66**

**ON QUASI  $\alpha\omega$ -OPEN FUNCTIONS**

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**Abstract**

In this paper, we introduce the notion of Quasi  $\alpha\omega$ -open function and investigate some of its fundamental properties and its characterisations.

**Keywords:**  $\alpha\omega$ -closed set,  $\alpha\omega$ -open set and Quasi  $\alpha\omega$ -function.

# EMEA-AM-67 FUZZY EOQ MODEL WITH STOCHASTIC LEAD TIME USING YAGER'S TECHNIQUE

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## Abstract

The inspiration driving here to look at the Economic order quantity model with the impact of stochastic Lead time decline on stock cost underneath hybrid .For this inventory models stock size is constant , We utilize exponential lead times to show that diminishing average lead time has an optional decrease of the difference because of request hybrid. Here we determine a methodology for diminishing the average and change for lead times. In this paper fuzzifies done in holding cost and deficiency cost coefficients using yager s ranking method,.

**Keywords :** *Inventory, Fuzzy, EOQ, backorder, stochastic lead time, lead time reduction,*

# EMEA-AM-68

## A NEW SIMILARITY MEASURE OF GENERALIZED INTUITIONISTIC FUZZY NUMBER

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### Abstract

In this article, we proposed a new similarity measure between generalized intuitionistic fuzzy numbers. It associates with the concepts of centre of gravity and height of GTrIFNs. Few relevant properties are discussed for the presented new similarity measure. Finally numerical example is illustrated.

**Keywords:** *Generalized Trapezoidal Intuitionistic Fuzzy Number, Similarity Measures, Centre of Gravity.*

# EMEA-AM-69

## EDGE DELETION AND INVARIANCE IN GRAPHS USING D-DISTANCE

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### Abstract

In this article, we study the radius invariance and diameter invariance after edge deletion in a graph using D-distance. We give examples to show that  $r^D(G) \leq r^D(G')$  and  $d^D(G) \leq d^D(G')$ . Next we study the invariance property in complete graphs, cyclic graphs and wheel graphs. The complete bipartite graph  $K_{m,m-1}$  is also studied.We end the article with some open problems.

# EMEA-AM-70

## TESTING BNRBU AGEING CLASS OF LIFE-TIME DISTRIBUTION BASED ON MOMENT INEQUALITY

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### Abstract

In this paper, new moment inequality is derived for Bivariate New Renewal Better than Used (BNRBU) ageing class of life-time distribution. This inequality demonstrates that if the mean life is finite, then all higher order moments exist. Based on the Moment inequality, new testing procedures for testing bivariate exponentiality against BNRBU ageing class of life-time distribution is introduced. The asymptotic normality of the test statistic and its consistency are studied. Using Monte Carlo Method, critical values of the proposed test are calculated for  $n = 5(5)100$  and tabulated. Finally, the theoretical results are applied to analyze real-life data sets.

**Keywords:** *Classes of life-time distribution, BNRBU, Moment inequality, U-statistic, Life testing.*

**EMEA-AM-71**  
**A FIXED POINT PROPERTY OF A CONCEPT ALTERING**  
**DISTANCE WITH PARTIAL ORDER RELATION**

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**Abstract:**

We obtain common fixed point theorems with application for two self maps on a complete metric space by using a concept of altering distances. These are the generalizations of the results of the Jose R.Morales and Edixon Rojas[5].

**Key words:** *Complete metric space, contractive mappings, altering distances, common fixed points.*

# EMEA-AM-72 FUZZY SOFT NORMED RINGS

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<sup>1</sup>Research Scholar Periyar University, Pg Extension Centre –Dharmapuri-India

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Pg Extension Centre-Dharmapuri-India

## Abstract

Molodtsov initiated the notion of soft set, which can be seen as a new mathematical tool for dealing with uncertainty. In this paper, we introduce the concept of fuzzy soft normed rings by the theory of soft set. The concept of fuzzy soft normed rings, fuzzy soft normed ideals, and fuzzy soft complete normed rings are explain with and also a number of connected laws and illustrations are given.

**Keywords:** *Fuzzy set, fuzzy soft set fuzzy normed rings, fuzzy soft normed ideals.*

**EMEA-AM-73**  
**APPLICATION OF VAGUE SETS IN VAGUE DETECTION OF -**  
**SIGNAL AVAILABILITY IN MULTI PATH WIRELESS**  
**CHANNELS**

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**Abstract**

Vague set has proven paramount in fuzzy mathematics due to its ability of tracking uncertainty involve in decision making. In this paper we develop a vague estimation of the availability of a radio signal from a mobile unit to the base station in a shadowing and multi path propagation environment. This estimation method provides a way to optimally manage the switching strategy of the base station depending on the signal level of the different mobile units served by that base station.

**Key words:** Vague sets, vague value, unit vague value, zero vague value, multipath channels.



**EMEA-AM-74**  
**CHARATERIZATIONS OF INTERVAL-VALUED**  
**INTUITIONISTIC FUZZY POSITIVE IMPLICATIVE HYPER**  
**BCK-IDEALS OF HYPER BCK-ALGEBRAS**

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**Abstract**

In this paper, we prove some theorems which characterize the notions of IVIFHBI's and interval-valued intuitionistic fuzzy positive implicative hyper BCK-ideals(IVIFPIHBI's) of types-1,2,3 and 4 of hyper BCK-algebras. Also, we investigate the relationship between these notions and some of related properties are investigated.

**Keywords:** Hyper BCK-algebra(HBI), Interval-valued intuitionistic fuzzy hyper BCK-ideals (IVIFHBI's)and Interval-valued intuitionistic fuzzy positive implicative hyper BCK-ideals(IVIFPIHBI's) of Types 1,2,3,4

**EMEA-AM-75**  
**GENETIC VARIABILITY, ASSOCIATION AND DIVERSITY**  
**STUDY AMONG THE SUNFLOWER GENOTYPES AT**  
**SEEDLING STAGE BASED ON DIFFERENT MORPHO-**  
**PHYSIOLOGICAL PARAMETERS UNDER POLYETHYLENE**  
**GLYCOL INDUCED STRESS**

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**Abstract**

Drought stress directly affects growth along with productivity of plants by altering plant water status. Sunflower (*Helianthus annuus* L.) an oilseed crop, is adversely affected by tic stresses. The present study was carried out to study the genetic variability and diversity among the sunflower genotypes at seedling stage based on different morpho-physiological parameters under Polyethylene Glycol (PEG) induced stress. A total of twenty seven genotypes including two hybrids, eight advanced lines and seventeen accessions of sunflower (*Helianthus annuus* L.) were tested at germination and seedling stages in Polyethylene Glycol. Correlation and principle component analysis confirmed that germination percentage, root length, proline content, shoot length, chlorophyll content, stomatal frequency and survival percentage are positively correlated with each other hence; these traits were responsible for most of variation among genotypes. The cluster analysis results showed that genotypes Ausun, line-2, line-8, 17559, 17578, Hysun-33, 17555, and 17587 as more diverse among all the genotypes. These most divergent genotypes could be utilized in the development of inbreed which could be subsequently used in the heterosis breeding.

**Key words:** Sunflower, drought, stress, polyethylene glycol

**EMEA-AM-76**  
**FRW COSMOLOGICAL MODELS FOR GENERAL**  
**RELATIVISTIC HYDRODYNAMICS FOR TIME VARYING**  
**DECELERATION PARAMETER**

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**Abstract**

Friedmann–Robertson–Walker (FRW) metric within the presence of General Relativistic Hydrodynamics in the context of General Theory of Relativity is considered. Exact solutions of field equations are obtained using the special form of the average scale factor derived by Abdussattar and Prajapati (2011) by constraining the deceleration parameter and a special form of deceleration parameter by Singh and Debnath (2009). The Phantom, Chaplygin gas and Tachyon fields are discussed.

**Keywords:** FRW, General Relativistic Hydrodynamics, General Relativity.

# EMEA-AM-77

## EXISTENCE OF POSITIVE SOLUTIONS FOR 3<sup>th</sup> ORDER THREE-POINT BOUNDARY VALUE PROBLEMS WITH p- LAPLACIAN OPERATOR

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### Abstract

In this paper, we consider the  $3n$  th order differential equations with p-Laplacian operator

$$(-1)^n [\phi_p(v^{(3n-3)}(t))]''' = g(t, v(t)), \quad t \in [0, 1],$$

satisfying three-point boundary conditions.

$$\left. \begin{aligned} v^{(3i)}(0) = 0, \quad v^{(3i+1)}(0) = 0, \quad v^{(3i+1)}(1) = \alpha_{i+1} v^{(3i+1)}(\eta), \\ [\phi_p(v^{(3n-3)}(t))]_{\text{at } t=0} = 0, \quad [\phi_p(v^{(3n-3)}(t))]_{\text{at } t=0}' = 0, \\ [\phi_p(v^{(3n-3)}(t))]_{\text{at } t=1}' = \alpha_n [\phi_p(v^{(3n-3)}(t))]_{\text{at } t=\eta}' \end{aligned} \right\}$$

for  $0 \leq i \leq n-2$ , where  $n \geq 2$ ,  $\eta \in (0, 1)$ ,  $\alpha_j \in (0, 1/\eta)$  is a constant for  $1 \leq j \leq n$ , and

$g : [0, 1] \times \mathbb{R}^+ \rightarrow \mathbb{R}^+$  is a continuous function and establish the existence of positive solutions to

the boundary value problem by applying Guo–Krasnosel'skii fixed point theorem.

**Keywords:** Green's function, p-Laplacian, boundary value problem, positive solution, cone, fixed point theorem.

# EMEA-AM-78

## EMOTION RECOGNITION FROM SPEECH USING MFCC

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### Abstract

Speech is an advanced signal consisting of varied data, regarding the message to be communicated, speaker, language, region, emotions etc. Speech process is one among the vital branches of digital signal processing and finds applications in Human Machine interface, Telecommunication, Audio mining, Security etc., Speech recognition is vital for natural interaction between human and machine. In speech emotion recognition, the emotion state of a speaker is extracted from his or her speech. The acoustic characteristic of the speech signal is Feature. Feature extraction is that the method that extracts a little quantity of information from the speech signal that may later be used to represent speaker. Several feature extraction strategies are implemented as of now and Mel Frequency Cepstral coefficient (MFCC). This paper presents speaker emotions recognized by using the information extracted from the speaker speech signal. Mel Frequency Cepstral coefficient (MFCC) technique is employed to acknowledge feeling of a speaker from their voice. The designed system was implemented for happy, sad and anger emotions and the potency was found to be about 82% for sad, 74% for angry, and 72% for happy.

**Keywords:** *Speech Processing, Emotion recognition, Feature extraction, MFCC*

**EMEA-AM-79**  
**IDEALS AND CONGRUENCES IN LATTICE ORDERED**  
**COMMUTATIVE LOOPS**

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**Abstract**

This manuscript illustrates the significance of a normal subloop, l-morphism, l-ideal of an l-loop also we have succeeded in determining a corresponding congruence relation on the l-loop and establishing a one-to-one correspondence between the l-ideals and congruence relations of an l-loop A.

**Key words:** Loops, partial order, lattices, ordered abelian groups, Ideals-congruence relations.

**EMEA-AM-80**  
**FUZZY EOQ MODEL WITH STOCHASTIC LEAD TIME USING**  
**YAGER'S TECHNIQUE**

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**Abstract**

The inspiration driving here to look at the Economic order quantity model with the impact of stochastic Lead time decline on stock cost underneath hybrid. For this inventory models stock size is constant, We utilize exponential lead times to show that diminishing average lead time has an optional decrease of the difference because of request hybrid. Here we determine a methodology for diminishing the average and change for lead times. In this paper fuzzyfies done in holding cost and deficiency cost coefficients using yager's ranking method,.

**Keywords :** Inventory, Fuzzy, EOQ, backorder, stochastic lead time, lead time reduction.

**EMEA-AM-81**  
**CERTAIN CLASSICAL PROPERTIES OF**  
**GENERALIZED HYPERGEOMETRIC TWO VARIABLE**  
**POLYNOMIALS**

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**Abstract**

An attempt has been made to derive certain properties of generalized hypergeometric two variable polynomials (GH2VP)  $I_n(\alpha; \beta; x, y)$ , namely, recurrence relations of ascending, descending type, ordinary differential equation and linear generating relation, which are needed in order to obtain many other properties of  $I_n(\alpha; \beta; x, y)$ . Furthermore, two variable Laguerre polynomials are deduced from  $I_n(\alpha; \beta; x, y)$  as a special case, which are of great importance in the basic quantum analysis of hydrogen atoms.

**Key Words:** Hypergeometric polynomials, Recurrence Relations, Generating functions.



# EMEA-AM-82

## INTERVAL-VALUED ANTI FUZZY WEAK BI-IDEALS OF BOOLEAN NEAR RINGS

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### Abstract

In this paper, we introduce the notion of interval valued Anti Fuzzy Weak bi-ideals of Boolean Near-rings. We have characterized and study some related properties of interval valued anti fuzzy weak bi-ideals of Boolean near-rings.

**Keywords:** *Near-rings Bi-ideals Fuzzy bi-ideals Interval valued fuzzy weak bi-ideal*

# EMEA-AM-83

## NON-SPLIT AND TOTAL NON-SPLIT DOMINATION IN AN UNDIRECTED GRAPH $G_{(m,n)}$

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### Abstract

A dominating set  $D$  of a graph  $G=(V,E)$  is called a non-split dominating set if the induced graph  $\langle V-D \rangle$  is connected. The non-split domination number of a graph is written as  $\gamma_{ns}(G_{(m,n)})$  and it is the minimum cardinality of a non-split dominating set. The total dominating set  $D$  of a connected graph  $G$  is a total non-split dominating set if the induced subgraph  $\langle V-D \rangle$  is connected. The total non-split domination number  $\gamma_{tns}(G)$  of  $G$  is the minimum cardinality of a total non-split dominating set. An undirected graph  $G_{(m,n)}$  is defined as a graph whose vertex set  $V=I_n=\{1,2,3,\dots,n\}$  where  $u,v \in V$  are adjacent if and only if  $u \neq v$  and  $u+v$  is not divisible by  $m$  where  $m$  belongs to natural numbers greater than 1. We find some results on dominating parameters of an undirected graph  $G_{(m,n)}$ . After studying several properties of this graph we derived some bounds for non-split domination number and total non-split domination number for different values of  $m,n$ .

*Key words: Domination, total domination, non-split domination, total non-split domination.*

# EMEA-AM-84 CUT SETS, CONVEX AND CONCAVE TYPE INTUITIONISTIC FUZZY SOFT SETS

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## **Abstract**

We introduced lower cut sets, upper cut sets, convex, concave, quasi convex and quasi concave sets in intuitionistic fuzzy soft sets. Also we derive the relations among them.

**Keywords:** *Convex set, Concave set*

# EMEA-AM-85

## ZAGREB INDICES OF ARITHMETIC GRAPHS

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### Abstract

A Topological index is a number associated with a graph. In chemical graph theory degree-based indices are much studied in recent days. In this paper we computed some results related to degree-based Zagreb indices on Arithmetic graphs.

*Keywords: Euler totient Cayley graph, Undirected  $G_{(m,n)}$  graph, Zagreb indices of a graph.*

# EMEA-AM-86 NEUTROSOPHIC CRISP IDEAL SUPRA TOPOLOGICAL SPACES

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## Abstract

Eutrosophic crisp ideal in neutrosophic crisp supra topology, neutrosophic crisp supra local functions, neutrosophic crisp supra L-open sets, L-continuity are introduced in this paper and some of its basic properties are investigated.

**Keywords:** NCS, NCSTS, NCSOS&NCSCS.

**EMEA-AM-87**  
 **$(\eta, \eta \vee \varepsilon)$  – NETROSOPHIC FILTERS OF LATTICE  
WAJSBERG ALGEBRAS**

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**Abstract**

In this paper the  $(\eta, \eta \vee \varepsilon)$  – netrosophic filter of Lattice wajsberg algebra is introduced and their properties are discussed. Relation between  $(\eta, \eta)$  – netrosophic filter and  $(\eta, \eta \vee \varepsilon(wT, wI, WF))$  - netrosophic filter are investigated. Characterizations of  $(\eta, \eta \vee \varepsilon(wT, wI, WF))$  netrosophic filters are proved and condition for a – netrosophic set be a  $(\eta, \eta \vee \varepsilon(wT, wI, WF))$  netrosophic filter .

*Keywords: Lattice wajsberg algebra, netrosophic set, netrosophic set  $\eta$  – set, , netrosophic set  $\varepsilon w$  – set, and  $(\eta, \eta \vee \varepsilon)$  – netrosophic filter.*

# EMEA-AM-88

## PAIRED EDGE DETOUR DOMINATION NUMBER OF SOME GRAPHS

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### Abstract

Let  $G$  be a connected graph with atleast two vertices. An edge detour dominating set  $S$  of  $G$  is called paired edge detour dominating set if the induced subgraph of  $S$  has a perfect matching. The paired edge detour domination number  $\gamma_{ped}(G)$  is the minimum cardinality taken over all perfect matching of edge detour dominating sets of  $G$ . The minimum paired edge detour dominating set is called  $\gamma_{ped}$ - set of  $G$ . We say that  $G$  has an infinite paired edge detour domination number if the edge detour dominating set in  $G$  is not perfectly matched. The paired edge detour domination number of some standard graphs are determined.

*Keywords: detour set, detour number, detour domination number, detour dominating set, edge detour dominating set, edge detour domination number, paired edge detour dominating set, paired edge detour domination number.*

# EMEA-AM-89 HAMILTONIAN DECOMPOSITION OF COMPLETE FUZZY GRAPHS

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## **Abstract**

In this paper we prove that the Hamiltonian decomposition of complete fuzzy graphs with  $2n$  vertices can be decomposed into the integer value of  $(2n - 1) / 2$  Complete Hamiltonian fuzzy cycles and the rest of the edges is  $n$  which forms the 1- factorization. And also we discuss about some results of complete fuzzy graphs and regular fuzzy graphs using fuzzy matrices.

**Keywords:** *Fuzzy graph, complete fuzzy graph, Hamiltonian fuzzy cycles, Regular fuzzy graph, Fuzzy matrices.*



# EMEA-AM-90

## BI-IDEALS IN TERNARY $\Gamma$ -SO-SEMIRINGS

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### Abstract

The set of all partial functions over a set under a natural addition, functional composition and functional relation on the, forms a  $\Gamma$ -SO-ring. The concepts of prime bi-ideal, semi prime bi-ideals in ternary  $\Gamma$ -SO-ring are introduced.

*Keywords: Prime bi-ideal, semiprime bi-ideal, proper bi-ideal.*

# EMEA-AM-91 EXPLORATORY APPROACH TOWARDS Q-FUZZY IDEALS

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## Abstract

Undoubtedly L.A. Zadeh is the pioneer in the initiation of fuzzy sets and moreover numerical contributions are made by researchers on the notion of fuzzy sets. Fuzzy sets encompass vast areas of research in engineering, medical sciences, social sciences, graph theory, etc. In this paper we introduce the concept of Q-fuzzy ideals and explore the properties and theorems on it.

**Keywords:** Fuzzy sets Q-fuzzy ideals

**EMEA-AM-92**  
**STRONGLY  $\alpha^*$ AS -CONTINUOUS MAPS AND PERFECTLY**  
 **$\alpha^*$ AS -CONTINUOUS MAPS IN TOPOLOGICAL SPACES**

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**Abstract**

P. Anbarasi Rodrigo and I. Sahaya Dani introduced properties of  $\alpha^*$ AS -closed sets in Topological space. Also, investigated  $\alpha^*$ AS- Continuous, Contra  $\alpha^*$ AS continuous,  $\alpha^*$ AS Homeomorphism and studied its properties. In this paper, we introduce strongly  $\alpha^*$ AS -continuous maps, and perfectly  $\alpha^*$ AS -continuous maps.

*Keywords:  $\alpha^*$ AS -closed sets, strongly  $\alpha^*$ AS -continuous maps, perfectly  $\alpha^*$ AS -continuous maps.*

# EMEA-AM-93 MACHINE LEARNING TECHNIQUES FOR ATMOSPHERIC DATA USING WEKA

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## **Abstract:**

Wind speed plays a vital role for rainfall and wind energy is produced with low cost using wind turbines. Wind speed is related with temperature, with temperature is high wind speed is also high and when temperature is low wind speed decreases with high moisture in air. In this paper we are fitted different regression models like Linear Regression, K-nearest neighbours, Reptree and Support Vector Regression using WEKA software. Variables are taken for interpretation is wind speed as dependent variable and day wise date, temperature, visibility as independent variables from 1.1.2017 to 1.1.2019. Various measures of accuracy used are Mean Absolute Error, Root Mean Square Error, Relative Absolute Error, Root Relative Squared Error.

**Keywords:** *Wind speed, regression models, MAE, RMSE, RAE, RRSE.*

# EMEA-AM-94

## WAVELET TRANSFORM OF FRACTIONAL INTEGRALS FOR PAN-INTEGRABLE BOEHMIANS

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### Abstract

In the existing relation between the wavelet transform and the Fourier transform, we construct pan-integrable Boehmians for Wavelet transform of fractional integrals using Riemann-Liouville fractional integral operators.

**Keywords:** *Wavelet transform; Fourier transform; pan-integrable Boehmians; Riemann-Liouville fractional integral operators; distribution spaces; Bohmian.*

# EMEA-AM-95 ON SUM OF POSITIVE INTEGRAL POWERS OF NATURAL NUMBERS

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## Abstract

The main objective of this paper is to show the sum of positive integral powers say  $k$ th powers of first  $n$ -natural numbers coincides with a polynomial function of degree  $k+1$  in  $n$  over natural numbers for any positive integer  $k$ . This has been an interesting problem to the mathematicians for decades. In this research article, the existence and uniqueness of the polynomial has been depicted with principles of Linear Algebra. Some astonishing results among the polynomial coefficients have been traced. Moreover the methods depicted here open a way to write a formula for sum of any positive integral powers of first  $n$ -natural numbers.

Keywords: Rank of a matrix, Coefficient matrix, Augmented matrix, Variable matrix, Nonhomogeneous linear equations.

**EMEA-AM-96**  
**A INNOVATIVE CONCEPT OF T-INTUITIONSTIC FUZZY**  
**SOFT IDEALS OF BG-ALGEBRAS**

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**Abstract**

The aspire of the paper is introduced the notion of T-intuitionstic fuzzy soft idelas of BG-algebras and prove some theorems of T-intuitionstic fuzzy soft idelas of BG-algebras also investigate some properties.

*Keywords: T-intuitionstic fuzzy soft set, T-intuitionstic fuzzy soft idelas, T-intuitionstic sub algebra, BG-Algebra, BG-subalgebra, BG-Ideal.*

# EMEA-AM-97 CSRR BASED COMPACT MIMO ANTENNA FOR UWB APPLICATIONS

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## Abstract

A Two Element Monopole MIMO antenna for UWB application is proposed, it uses square shaped Complementary Split Ring Resonators (CSRR) loading on its patch plane. The CSRR contributes to gain improvement and size reduction, to reduce the mutual coupling between radiating elements long stubs are inserted in the ground. The proposed design ranging the impedance bandwidth 2.7 GHz to 10.65 GHz for a reflection Coefficient < -10dB, Parametric analysis conducted to investigate bandwidth and gain characteristics. Keywords: UWB, MIMO, CSRR, MEG



# EMEA-AM-98

## DYNAMIC ANALYSIS OF A REACTION DIFFUSION PREY PREDATOR ALLELOPATHIC SYSTEM WITH HARVESTING

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### Abstract

In this article, we investigate the dynamical properties of a reaction diffusion system with allelopathic impact and diverse harvesting endeavors in the prey-predator population. We initially investigate the corresponding characteristic equation, the local and globally stability for the relating without diffusion system. The vital and adequate conditions are inferred for the instability of diffusion system. We additional demonstrated that the interior stability point is globally stable for the corresponding diffusion system. Our expository result, supported by the consequences of mathematical trials, recommends that a precarious diffusive structure can be made stable by expanding diffusivity consistent term.

**Key words:** Marine eco system, Diffusion, Local and Global stable, Allelopathic, Harvesting.

**EMEA-AM-99**

## **HARMONIOUS LABELING GRAPH OF A GROUP**

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### **Abstract**

Let  $G$  be a commutative group. The Harmonious labeling graph  $f(G)$  of  $G$  is the undirected graph with vertex set  $G$  and two distinct vertices  $a$  and  $b$  are adjacent if  $a + b$  is a mod  $m$  in  $G$ . In this paper, we present a study of results on the Harmonious labeling graph of  $f(G)$  and its generalizations.

**KeyWords:** Harmonious labeling, dihedral group, cyclic group, abelian group, wheel graph.

**EMEA-AM-100**

**$Z_{(\alpha, \beta, \psi, g)}$ -GERAGHTY TYPE CONTRACTION ON B - METRIC SPACES**

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**Abstract**

In this paper, we obtain a  $Z_{(\alpha, \beta, \psi, g)}$ -Geraghty type fixed point theorem by using wt-distance on b - metric spaces. Also we give an example which supports our main theorem.

**Keywords:** b - Metric space,  $Z_{(\alpha, \beta, \psi, g)}$ -Geraghty type contraction, C - Class function.

**EMEA-AM-101**

**ON SOFT  $A_{RS}$  - CLOSED SETS IN SOFT BITOPOLOGICAL SPACES**

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**Abstract**

In this paper a new class of Soft  $A_{RS}$  closed sets in Soft bitopological spaces and some of its characteristics investigated.

**Keywords:** (1,2) - Soft  $A_{RS}$  closed, (1,2) - Soft  $A_{RS}$  open.

**EMEA-AM-102**

## **3-ABSORBING PRIMARY IDEALS**

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### **Abstract**

The notions of 3-absorbing primary ideals of ternary  $\Gamma$ -SO semiring were introduced in the following manuscript and obtain corresponding conditions and some characteristics of 3-absorbing primary ideals in ternary  $\Gamma$ -SO semirings.

**Keywords:** Ternary  $\Gamma$ -SO semiring, 3-absorbing primary ideals.

**EMEA-AM-103**

**A INNOVATIVE CONCEPT OF T-INTUITIONSTIC FUZZY  
SOFT IDEALS OF BG-ALGEBRAS**

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**Abstract**

The aspire of the paper is introduced the notion of T-intuitionstic fuzzy soft idelas of BG-algebras and prove some theorems of T-intuitionstic fuzzy soft idelas of BG-algebras also investigate some properties.

**Keywords:** T-intuitionstic fuzzy soft set, T-intuitionstic fuzzy soft idelas, T-intuitionstic sub algebra, BG-Algebra, BG-sub algebra, BG-Ideal.

**EMEA-AM-104**

**A STUDY ON ATOMS IN FUZZY LATTICE ORDERED LOOPS**

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**Abstract**

In this paper, we introduce the definition and examples of Fuzzy lattice ordered loops. Further, we discuss some important characteristics of atoms in Fuzzy lattice ordered loops. And we initiate the concepts of positive and negative atoms.

**EMEA-AM-105**

**MATHEMATICAL MODEL OF TUBERCULOSIS WITH DRUG RESISTANCE TO THE FIRST AND SECOND LINE OF TREATMENT**

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**ABSTRACT**

This study proposed a mathematical model of tuberculosis with drug resistance to a first and second line of treatment. The basic reproduction number for the model using next generation method is obtained. The equilibrium point of the model was investigated and also found the global stability of the disease free equilibrium and endemic equilibrium for the model. This study shows the effect of resistance rate of the first and second line of treatment to the infected and resistant population. If basic reproduction number is less than one, the disease free equilibrium is globally asymptotically stable and if basic reproduction number is greater than one, then the endemic equilibrium is a globally asymptotically stable.

**Keywords:** Tuberculosis, Mycobacterium tuberculosis bacteria [Mtb], developed multi-drug resistant [MDR], Basic reproduction number, Stability.



**EMEA-AM-106**

## **VAGUE QUASI-INTERIOR IDEALS OF $\Gamma$ -SEMIRINGS**

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### **Abstract**

In this paper, we introduce the notion of quasi-interior ideal as a generalization of left (resp. right) ideal and interior ideal of  $\Gamma$ -semiring and we characterize the regular  $\Gamma$ -semiring in terms of vague quasi-interior ideal of  $\Gamma$ -semiring.

*Keywords:  $\Gamma$ -semiring, regular  $\Gamma$ -semiring, quasi-interior ideal, vague quasi-interior ideal.*

**EMEA-AM-107**

## **ANALYTICAL STUDY OF VARIOUS DOMINATIONS ON BIPOLAR FUZZY GRAPHS**

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### **ABSTRACT**

In this paper we discussed the prominence of Bipolar fuzzy graphs (BFG). Fuzzy set assigns a sequence of membership values to the elements of the universal set ranging from 0 to 1, whereas now our study about Bipolar fuzzy graphs whose membership degree range is  $[-1, 1]$ . The earnest efforts of the researchers are perceivable in the relevant establishment of the subject integrating coherent practicality and reality. When we assess the position of an object in space, we may have positive information expressed as a set of possible places and negative information expressed as a set of impossible places. This corresponds to the idea that the union of positive and negative information does not cover the whole space. Dominating sets have a vital function regarding the theory of fuzzy graphs. Traveling salesman problem, communication network, traffic route problem are largely discussed applications among the diverse applications dealing with the theory of dominations. In this paper we generalized Bipolar fuzzy graphs and explored various types of dominations on Bipolar fuzzy graphs such as Strong Dominations, Split and non-split dominations, Multiple dominations and some applications of Bipolar fuzzy graphs. Fuzzy graphs found an increasing number of applications in modeling real time systems where the information inherent in the system varies with different levels of precision. Bipolar fuzzy graphs can be used to model many problems in economics, operations research, etc; involving two similar, but opposite type of qualitative variables like success and failure, gain and loss etc.

***Keywords:*** Bipolar fuzzy graph, order and size of BFG, Bipolar bridges, Strong Bipolar fuzzy graph, Total domination on fuzzy graphs, Split and non-split domination on bipolar fuzzy graphs.

**EMEA-AM-108**

**ASYMPTOTIC PROPERTIES FOR SYLVESTER MATRIX  
IMPULSIVE VOLTERRA INTEGRAL-DYNAMICAL SYSTEM  
ON TIME SCALES**

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**Abstract**

Using the matrix impulsive, a principal matrix and equivalent system. Also, we developed Asymptotic properties for Sylvester matrix impulsive Volterra integral-dynamical system on time scale calculus.

**Keywords:** Asymptotic equilibrium, asymptotic equivalence, Volterra intrgro-dynamical, time scales.

**EMEA-AM-109**

**$\alpha_A^*$ CONTINUOUS FUNCTIO IN      *TOPOLOGICAL SPACES***

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**Abstract**

In this chapter, we define various functions associated with  $\alpha_A^*$ - open sets. Here we define  $\alpha_A^*$ - continuous,  $\alpha_A^*$ - irresolute, strongly  $\alpha_A^*$ - continuous and perfectly  $\alpha_A^*$  - continuous and we compare the concepts of these functions with already existing concepts. We also define open and closed maps using  $\alpha_A^*$ - open sets and discuss its properties and compare its properties with other functions. Further we give characterizations for these functions and discuss the relationship with already existing concepts.

**Keywords:** $\alpha_A^*$  -continuous funtion,  $\alpha_A^*$  -irresolute function and  $\alpha_A^*$ - perfectly continuous function.

**EMEA-AM-110**

**APPLICATION OF VAGUE SETS IN VAGUE DETECTION OF -  
SIGNAL AVAILABILITY IN MULTI PATH WIRELESS  
CHANNELS**

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**Abstract**

Vague set has proven paramount in fuzzy mathematics due to its ability of tracking uncertainty involve in decision making. In this paper we develop a vague estimation of the availability of a radio signal from a mobile unit to the base station in a shadowing and multi path propagation environment. This estimation method provides a way to optimally manage the switching strategy of the base station depending on the signal level of the different mobile units served by that base station.

Keywords: Vague sets, vague value, unit vague value, zero vague value, multipath channels

# EMEA-AM-111

## A STUDY OF LATTICE -VAGUE PRIME-IDEAL OF A $\Gamma$ - NEAR RING

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### Abstract

In this piece of work, we establish and study the concept of a L-VPI-GNR and its properties, taking values in a complete Brouwerian lattice satisfying infinite meet distributive law. We propose and analysis the concepts of L-VPI-GNR in L. In fact, an LVS,  $\eta = (t_\eta, f_\eta)$  where  $t_\eta, f_\eta : Q \rightarrow L$  such as  $t_\eta(h) \leq 1_L - f_\eta(h)$ ,  $f_\eta(h) \leq 1_L - t_\eta(h), \forall h \in Q$ . The function  $t_\eta, f_\eta$  define the degree of membership and non-membership function. Also,  $1_L - f_\eta(h)$  and  $1_L - t_\eta(h)$  are elements in Brouwerian lattice L, which are described as

$$1_L - t_\eta(h) = \inf_{\delta \in L} \{ \delta \in L / 1_L \leq t_\eta(h) \vee \delta \} \text{ and}$$

$$1_L - f_\eta(h) = \inf_{\delta \in L} \{ \delta \in L / 1_L \leq f_\eta(h) \vee \delta \}$$

we prove a lemma (3.4), which shows an vital role in the analysis of L-VPI-GNR and L-VMI-GNR. Additionally, we determine all L-VPI-GNR of a GNR, Q by establishing a one-one correspondence between L-VPI-GNR of Q and the pairs  $(I, \delta)$  where I is a prime ideal of Q and  $\delta$  is a prime element in L.

*Key Words:* L- Vague set, Vague cut, L- Vague ideal  $\Gamma$ - Near ring.

## EMEA-AM-112

# A STUDY OF LATTICE -VAGUE MAXIMAL-IDEAL OF A $\Gamma$ -NEAR RING

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### Abstract

In this piece of research work, we Originate and analyse the notion of a Lattice-vague maximal ideal of a  $\Gamma$ - Near ring and explore various properties of it taking values in a complete Brouwerian lattice satisfying infinite meet distributive law. we determine all **L-VMI-GNR** of  $\mathcal{H}$  by establishing a one-one correspondence between **L-VMI-GNR** of  $\mathcal{H}$  and the pairs  $(M_I, \rho)$  where  $M_I$  is a **MI-GNR** of  $\mathcal{H}$ ,  $\rho$  is a dual atom in L. If  $K = (t_K, f_K)$  is a **LVS** of  $\mathcal{H}$  then  $K$  is a **L-VMI-GNR** of  $\mathcal{H}$  if and only if there exists **MI-GNR**,  $M_I$  of  $\mathcal{H}$  and a dual atom  $\rho$  in L such as

$$V_K(f) = \begin{cases} [1_L, 1_L] & \text{if } f \in K \\ [\rho, 1_L] & \text{else} \end{cases}$$

**Key Words:** L- Vague set, Vague cut, L- Vague ideal  $\Gamma$ - Near ring.

**EMEA-AM-113**

## **A STUDY OF LATTICE -VAGUE IDEAL OF A $\Gamma$ - NEAR RING**

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### **Abstract**

In this research article, we propose and explore the idea of a L-VI-GNR and several properties of it, taking values in a complete lattice  $L$ - satisfying infinite meet distributive law. Also, we demonstrate that the intersection of two L-VI-GNR is also a L-VI-GNR. Furthermore, we discussed a particular case of union of two L-VI-GNR is a L-VI-GNR. Moreover, in this article, we originate upper LVC,  $[[U(N)]_{\alpha}]$  and lower LVC,  $[[L(N)]_{\alpha}]$  of  $W$  and demonstrate that a LVS,  $N = (t_N, f_N)$  is a L-VI-GNR if and only if  $[[U(N)]_{\alpha}] \neq \emptyset$  and  $[[L(N)]_{\alpha}] \neq \emptyset$  are I-GNR of  $W$ ,  $\forall \alpha \in L$ .

Key Words: L- Vague set, Vague cut, L- Vague ideal  $\Gamma$ - Near ring.



**EMEA-AM-114**

**TECHNOLOGY ENHANCED LEARNING AND MOOCS  
EXPERIENCES**

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**Abstract**

The main object of this paper is to provide modern software tools to the students in learning engineering mathematics much better easily. This paper deals with the usage of modern tools in the class rooms with the traditional way of teaching. Teaching Engineering Mathematics effectively to these millennial students is not that much easy. Students are upgrading with the technology drastically and learning the courses through MOOCS online courses, whereas few faculties are still confined to traditional way of teaching i.e., board chalk and talk method. So, to make the students enhance their learning, the faculty has to use various modern technological tools in the classrooms which not only grabs the attention of the students but also improves their learning styles and logical thinking.

*Keywords: Modern Tools, Enhance Learning, MOOCS, Logical thinking.*

**EMEA-AM-115**

**TRENDS ON DOMINATIONS OF FUZZY GRAPHS AND ANTI  
FUZZY GRAPHS**

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**Abstract**

After introducing and developing fuzzy graph theory, a lot of studies have been done in this field. The object of this paper is to demonstrate various Dominations such as Edge domination, Total domination, Strong (weak) domination, Regular domination, connected domination, Split (non-split) domination in fuzzy graphs, with their importance and applications in real world. In this paper we extended our study to total, connected and split dominations in Anti Fuzzy graphs. The diversity of applications of domination theory to both real world and mathematical coverings or location problems. The wide varieties of domination parameters are defined.

**Key words:** *Fuzzy graph, Domination, total domination, regular domination, edge domination, split domination, Inverse domination, Anti Fuzzy graph.*

**EMEA-AM-116**

**ON LATTICE -FUZZY COSETS OF A  $\Gamma$ - NEAR RING**

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**Abstract**

In this section, we define the concept of a LFCO of a LF-IGNR of  $V$  where  $L$  is a complete lattice satisfying infinite meet distributive law. We have studied the properties of it. Also, we presented the one-one correspondence between LFCO of a LF-IGNR and Crisp Coset of a IGNR. Key Words: L-Fuzzy set, L-Fuzzy Coset, L- Fuzzy ideal  $\Gamma$ - Near ring.

**EMEA-AM-117**

**MAXIMAL QUASI-HYPERIDEALS IN TERNARY  
SEMIHYPERGROUPS**

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**Abstract.**

In this article, we introduce the zero-quasi-simple and maximal quasi-hyperideal and few properties of them were investigated.

**EMEA-AM-118**

# **ANALYSIS OF MIMO DETECTOR USING ARTIFICIAL NEURAL NETWORK AND DEEP NEURAL NETWORK**

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## **Abstract**

Next generation cellular wireless communication network should be effective, ultra reliable, low latency and an intelligent Network. By using Artificial Neural Network based algorithms can be preferred to solve current wireless network problems. The most complicated problems in current wireless network possibly effectively formulated and efficiently solved using Artificial Neural Network and powerful Deep Neural Networks. The DNN approach proved to be less complex with better BER performance over traditional MIMO detectors. This paper proposes the Conventional Neural network and Deep Neural Network proceeds for implementation of MIMO detectors. The proposed method exhibits better robustness and better BER performance.

**EMEA-AM-119**

**BOOSTING VECTOR QUANTIZATION TECHNIQUE USING  
FAST DIRECTIONAL SHRINKING SEARCH OPTIMIZATION  
(DSSO) ALGORITHM**

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**Abstract:**

A new fast vector quantization along with a novel fast heuristic optimization algorithm has been proposed in this paper that efficiently boosts the process of finding the global optimum region in the search region. Stochastic variables are used in this algorithm to excel the speed of exploration and exploitation and at the same time making the whole process of vector quantization (VQ) computationally efficient. The search domain gradually shrinks to make algorithm effective and efficient. On comparing the simulation results of VQ based on particle swarm optimization (PSO), quantum particle swarm optimization (QPSO) and firefly algorithm (FFA) using some well known benchmark functions has validated the efficiency of the algorithm. In finding the global optimum point, the proposed algorithm decreases the computing time 44 % relative to others. Vector quantization based image compression is a NP-hard problem has been successfully and efficiently solved in this proposed work.

**Keywords:** *Heuristic optimization algorithm, Particle swarm optimization (PSO), Quantum particle swarm optimization (QPSO), Firefly algorithm (FFA), Benchmark Functions, Vector quantization*

**EMEA-AM-120**

## **EXPLORATORY APPROACH TOWARDS Q-FUZZY IDEALS**

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### **ABSTRACT:**

Undoubtedly L.A. Zadeh is the pioneer in the initiation of fuzzy sets and moreover numerical contributions are made by researchers on the notion of fuzzy sets. Fuzzy sets encompass vast areas of research in engineering, medical sciences, social sciences, graph theory, etc. In this paper we introduce the concept of Q-fuzzy ideals and explore the properties and theorems on it .

**Keywords:** *Fuzzy groups, Fuzzy sets and logic, Theory of fuzzy sets, fuzzy lattices, fuzzy algebraic structures.*

## EMEA-AM-121

# ON MYSTERIOUS NUMBER 6174 KAPREKAR CONSTANT

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### Abstract

The prime objective of this article is to chase the mystery of fourth order Kaprekar constant 6174 using the principles of Linear Algebra and to hunt the other ordered Kaprekar constants. Kaprekar constant 6174 has been an interesting one with its mystery for decades in the research field of Analytical Number theory. Many recreational and experimental Mathematicians have been studying this number for years. In this research paper an attempt has been made to trace the mystery behavior that Kaprekar constant 6174 and other Kaprekar constant of any order. The method discussed here ensures a way to hunt Kaprekar constants of any order. Furthermore the proof of the existence and uniqueness of third order Kaprekar constant has been proposed and this proof can be implemented to find the Kaprekar constant of any order if they exist.

Keywords: Convergence, Kaprekar Process, Kaprekar Constant, Derrangements, NHLE, Bijection, Gauss-Jordan Method, Augmented Matrix, Rank, Echelon Matrix.



**EMEA-AM-122**

**EFFECTS OF PRE-EXISTING DRUG AGAINST COVID-19-  
CHLOROQUINE**

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**Abstract**

An overwhelming therapeutic work is carried out throughout the COVID-19 outbreak for its healing. The urgency of the situation demands the re-use of an active drugs that may or may not belongs to the antiviral category. Clinical trials working on the appropriate medicines to examine their efficacy against COVID-19. On the other side, Chloroquine (CQ) which is known to be used against malaria in the past years seems to be working against COVID-19 due to its lysomotropic effects. Owing to the antiviral properties of CQ, it has become possible to combat with COVID-19 and patients can heal better than before. This review gives an overview about the history as well as structural characteristics of CQ. Various applications, along with their adverse effects, pharmacology and mechanism of action as an antimalarial drug, are briefly discussed in the following sections. The last section of the paper critically illuminates the CQ to be used against COVID-19, its mechanism of action against the virus, as well as the required dosage to be taken by patients and the different drugs that can be used in combination to eradicate the novel coronavirus.

**EMEA-AM-123**

**WAVELET TRANSFORM OF FRACTIONAL INTEGRALS FOR  
FUZZY-INTEGRABLE BOEHMIANS**

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**Abstract:**

In view of, the existing relation between the wavelet transform and the Fourier transform, we obtained fuzzy-integrable Boehmians defined on the Boehmians space for the wavelet transform of fractional integrals using Riemann-Liouville fractional integral operators.

*Keywords: Wavelet transform; Fourier transform; fuzzy-integrable Boehmians; Riemann-Liouville fractional integral operators; distribution spaces; Bohmian.*

**EMEA-AM-124**

**ON SOFT ARS-CLOSED SETS IN SOFT BITOPOLOGICAL SPACES P**

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**Abstract**

In this paper a new class of Soft ARS closed sets in Soft bitopological spaces and some of its characteristics investigated.

*Keywords : (1,2) - Soft ARS closed, (1,2) - Soft ARS open*

## EMEA-AM-125

# $\Psi$ -STABILITY FOR NONLINEAR MATRIX DIFFERENCE EQUATIONS

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### Abstract

By applying the concept of Kronecker product of matrices, in this paper we develop the sufficient conditions for  $\Psi$ - stability for trivial solution of the first order non linear matrix difference equations

$$Y(t+1) = M(t) Y(t) N(t) + F(t, Y(t)) \quad \text{-----(1.1)}$$

as a perturbed equation of the linear equation

$$Y(t+1) = M(t) Y(t) N(t) \text{-----} \text{-----}(1.2)$$

where  $M(t), N(t)$ , and  $F(t, Y(t))$  are  $m \times m$  nonsingular matrix-valued functions on  $N = \{0, 1, 2, \dots\}$  with  $F(n, 0) = 0$ .

**Key words:** *Difference equations, Fundamental matrices, Kronecker product of matrices,  $\Psi$ -stability.*

**EMEA-AM-126**

**EXISTENCE AND UNIQUENESS OF SECOND-ORDER FUZZY  
INTEGRO-DYNAMIC EQUATIONS ON TIME SCALES UNDER  
GENERALIZED HUKUHARA DELTA DERIVATIVE**

**M.N.L.Anuradha, Ch. Vasavi, G. Suresh Kumar and K. Pushpa Latha**

**Abstract**

In this paper, second-order fuzzy-integro dynamic equations on time scales (SFIDETs) under generalized Hukuhara differentiability are introduced and studied the existence and uniqueness results of solutions to SFIDETs using Banach contraction principle and successive approximations. Some examples are presented to illustrate the applicability of the proposed method.

*Keywords: Interval-valued differential equations; Interval-valued second-order differential equations; Generalized Hukuhara derivative, Time scales.*

**EMEA-AM-127**

**ROTARY OSCILLATIONS OF AN INCOMPRESSIBLE COUPLE  
STRESS FLUID GENERATED BY THE TWO CONCENTRIC  
SPHERES**

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**Abstract:**

The paper deals with the oscillatory flow of an incompressible couple stress fluid generated by the rotary oscillations of two concentric spheres. The concentric region between the spheres is filled by a couple stress fluid and the two spheres are assumed to oscillate about a common diameter with the same frequency and with different angular speeds. The relevant components of stress tensor and couple stress tensor are obtained and the couple experienced by the spheres is evaluated. The couple is expressed in terms of two quantities  $K$  and  $K'$  and their variation is presented with respect to couple stress parameter and frequency parameter through graphs.

**Key words** :Oscillatory flow; Rotary oscillations; Couple stress fluid; Couple;

**EMEA-AM-128**

**MHD PRANDTL NANOFUID FLOW PAST A  
CONVECTIVELY HEATED STRETCHING SHEET BELOW THE  
CONTROL OF CHEMICAL REACTION WITH THERMAL  
RADIATION**

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**Abstract**

The present work reveals the aspects of MHD Prandtl nanofluid flow under consideration of convective boundary condition over stretched sheet. The current flow model of PDE's is transmuted to non-linear ODE's using similarity variables after which the numerical treatment is carried out by Runge-Kutta method clubbed with a shooting technique. The physical virtues of flow restrictions on velocity, temperature and concentration are discussed vividly. The flow geometry shows the improvement in the velocity profile for rising value of the fluid parameter and decrement in temperature and concentration distribution.

*Keywords: Magneto hydrodynamics (MHD), Prandtl Nanofluid, Convective boundary condition, Thermal radiation, Chemical reaction.*

**EMEA-AM-129**

**MHD FLOW AND TEMPERATURE DISTRIBUTION OF TWO  
IMMISCIBLE FLUIDS BETWEEN TWO HORIZONTAL  
PARALLEL PLATES IN A ROTATING SYSTEM**

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**Abstract**

The problem of two fluid magnetohydrodynamic flow and temperature distribution in a parallel plate channel is studied when the whole system is rotated with an angular velocity. The fluids in both the phases are assumed to be immiscible, incompressible, electrically conducting and have different viscosities, thermal and electrical conductivities. The bounding plates are maintained at constant and two different temperatures. The resulting differential equations are solved analytically for both the regions. The effects of various parameters such as rotation parameter, Hartmann number, ratio of viscosity and ratio of thermal conductivities are discussed.



**EMEA-AM-130**

**MHD POWELL-EYRING NANO-FLUID FLOW NEAR A STAGNATION POINT OVER CONVECTIVELY HEATED SURFACE IN THE PRESENCE OF CHEMICAL REACTION WITH THERMAL RADIATION**

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**Abstract**

In this paper, we study the unsteady MHD flow of a Nano Powell-Eyring fluid near stagnation point past a convectively heated stretching sheet in the existence of chemical reaction with thermal radiation. The physical model governed by a system of non-linear PDEs is converted into a system of non-linear ODEs through group transformation until being studied numerically through the Runge-Kutta fourth order method together with a shooting technique. The associated physical parameters are examined and discussed graphically on the velocity, temperature and concentration distribution.

**Keywords:** *Magnetohydrodynamics (MHD), Powell-Eyring nanofluid, Convective boundary conditions, Thermal radiation, Chemical reaction, Group theoretic analysis.*

**EMEA-AM-131**

**VISCOUS DISSIPATION, INTERNAL HEAT GENERATION  
(ABSORPTION) EFFECTS ON FREE CONVECTION FLOW  
ABOUT A VERTICAL FLAT PLATE WITH AN APPLIED  
MAGNETIC FIELD**

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**Abstract**

A numerical technique has been carried out to describe the boundary layer flow and heat transfer on a free convection flow about a vertical flat plate in the presence of Viscous dissipation, Internal heat generation (absorption) along with MHD. Suitable transformation is utilized to form a system of coupled nonlinear partial differential equations for governing both the flow and heat transfer. These equations have been solved numerically by utilizing an implicit finite difference scheme along with quasilinearization method. The measured numerical results expressed here are addressed, discussed and described in terms of temperature distribution and velocity distribution for various values of the magnetic field, Prandtl number, viscous dissipation and internal heat generation (Absorption), which are of physical and engineering interest.

**Keywords:** Convection, Internal heat generation, MHD, Prandtl number, Viscous dissipation.

**EMEA-AM-132**

**THERMOHYDRODYNAMIC LUBRICATION OF  
ASYMMETRIC**

**ROLLERS BY BINGHAM PLASTIC FLUID**

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**Abstract**

This research work focuses on qualitative analysis of hydrodynamic lubrication of asymmetric rollers under usual boundary conditions for a heavily loaded rigid system where the viscosity of non-Newtonian incompressible Bingham plastic fluid is assumed to vary with hydrodynamic pressure. The fluid flow governing equations such as continuity with momentum equation and thermal energy equation are solved analytically first and then numerically using MATLAB. Some important characteristics of the roller bearings are elaborated through graphs and tables. Finally, it is concluded that a significant change in pressure, temperature, load and traction with Newtonian and non-Newtonian fluids is observed. The results are in good agreement with the results available in literature.

**Keywords:** Hydrodynamic lubrication, Non-Newtonian, Bingham plastic, Thermal effects, Viscosity, Incompressible.

**EMEA-AM-133**

**UNSTEADY MHD FLOW PAST AN INCLINED POROUS  
PLATE IN THE PRESENCE OF RADIATION AND CHEMICAL  
REACTION EFFECTS**

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**Abstract**

We study an investigated impact of heat and mass transfer effects on MHD flow past, an inclined porous plate in the presence of radiation and chemical reaction effects. An exertion has been analyzed of the Soret effect and the influence of an angle of inclination on the flow field, in the presence of the heat source, chemical reaction and thermal radiation. The governing nonlinear boundary layer equations are transformed into a system of nonlinear ordinary differential equations and solved analytically by a closed analytical method. The results of the velocity, temperature and concentration fields are obtained which are appreciably influenced by the magnetic parameter, thermal radiation, and chemical reaction. It was noticed that the when the magnetic field, Prandtl number, chemical reaction increases, the velocity profiles decrease. There is also a considerable effect of the magnetic field and chemical reaction on skin friction, Nusselt number and Sherwood number.

*Keywords:* Chemical reaction, Heat source, inclined plate, porous medium, thermal radiation.

**EMEA-AM-134**

**ANALYSIS OF ARRHENIUS ACTIVATION ENERGY ON  
CASSON FLUID FLOW OVER A POROUS STRETCHING  
SHEET EMBEDDED IN A DOUBLY STRATIFIED MEDIUM**

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**ABSTRACT**

The upfront intention of this study is to explore thermal and mass stratification effects on Casson fluid induced due to porous stretching sheet taking Arrhenius activation energy, thermal radiation, and heat source into account. Uniform magnetic field is imposed on the fluid flow. Similarity variables are induced to transmute partial differential equations into ordinary differential equations and are solved numerically by elegant method bvp4c. To scrutinize the behavior of dimensionless parameters on flow configurations, graphs and tables are portrayed. From graphical consequences it is analysed that activation energy parameter enhances concentration profiles, whereas both reaction rate parameter and temperature difference parameter diminishes concentration profiles. This study also reported that non Newtonian rheology parameter, magnetic field parameter reduces velocity profiles. Impact of Skin friction, Sherwood and Nusselt numbers on the flow configurations for diverse critical parameters are exposed realistically via graphs. Arithmetical results that obtained in the current exploration are confirmed with previously explored values in very marginal way.

**Key words:** Casson fluid, MHD, Double stratified medium, Activation energy parameter, temperature difference parameter, reaction rate parameter, porous parameter.

**EMEA-AM-135**

## **Numerical Investigations of MHD Casson Nanofluid flow over a wedge through Porous medium**

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### **ABSTRACT**

The aim of current Paper examines the effect of heat source parameter over a wedge through porous medium for electrically conducting fluid flow of a magneto hydrodynamic Casson nanofluid with activation energy. The influence of second law analysis for electrically conducting fluid with chemical reaction also investigated. Dimensionless ordinary differential equations are obtained from the highly non-linear PDEs by using similarity transformations. The Runge- Kutta –Fehlberg with shooting technique is used to solve remodelled ODEs numerically. The effects of the physical parameter on temperature, velocity, and concentration have been discussed through several plots. Numerical results of the skin friction coefficient, Nusselt number, and Sherwood number for different parameters are computed.

**Key words:** Heat source parameter, Activation energy, Chemical reaction, Skin friction coefficient and Porous medium

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**EMEA-AM-136**

**EFFECTS AND ANALYSIS OF ACTIVATION FUNCTIONS IN  
ARTIFICIAL NEURAL NETWORKS USING NN TOOL IN  
MATLAB ON WEATHER PARAMETERS**

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**ABSTRACT**

Implementation of Activation Functions in Elman Backpropagation Neural Network, NARX(Non-linear AutoRegressive Exogeneous) and FeedForward Back Propagation Neural Network have been done and also studied the effects of those Activation Functions in terms of Accuracy by using the best measure known as RMSE. We have discussed Best Validation Performance in all the cases. We used very large dataset, which is for a period of five years of our country consisting of Weather parameters such as Minimum Temperature, Maximum Temperature, Visibility and Windspeed for Training, Testing and Validation. In the present work Elman BackPropagation shows accurate results. Simultaneously, Activation Function TANSIG supports the Neural network with not much difference comparing to others.

**Keywords:**Back Propagation Neural Network, NARX, Feed Forward Neural Network, Activation Function, NN Tool.

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**EMEA-AM-137**

**MHD MIXED CONVECTIVE FLOW OF A VERTICAL POROUS SURFACE IN THE PRESENCE VISCOUS DISSIPATION**

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**ABSTRACT**

The present paper addresses the combined effects of thermal radiation and chemical reaction on steady MHD mixed convective flow of heat and mass transfer past a vertical porous surface under the influence of Joule and viscous dissipation. The governing system of the partial differential equations is transformed into the dimensionless equations using dimensionless variables. The dimensionless equations are solved numerically using two term perturbation technique. The effects of the various parameters entering into the problem on the dimensionless velocity, temperature and concentration fields within the boundary layer are discussed qualitatively.

**Keywords:** MHD; Ohmic heating; viscous dissipation; Radiation; Chemical reaction, Skinfriction.



**EMEA-AM-138**

**GEOMETRY OF STENOSIS AND ITS EFFECTS ON THE  
BLOODFLOW THROUGH AN ARTERY-A THEORETICAL  
STUDY**

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**Abstract**

A study on blood flow through a stenotic provides a better understanding of the physiology and challenges faced in the treatment of atherosclerosis. The shape, length and height of the stenosis in an artery under various flow conditions play a pivotal role. Research has been carried out by many researchers on the nature of geometry of the stenosis in the artery, nature of the blood and its flow. The results related to the various flow properties such as wall shear stress, velocity, pressure drop, resistance to the flow and the flow velocity have been found by many researchers. This paper presents a review on the geometry and methods of solving the model under various conditions.

**Keywords:** Overlapped stenosis, inclined artery, balloon model.

**EMEA-AM-139**

**HEAT AND MASS TRANSFER EFFECTS ON NON-  
NEWTONIAN NANO LIQUID OVER A NONLINEAR  
PENETRABLE ELONGATED SHEET WITH THERMAL  
RADIATION AND CHEMICAL REACTION**

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**Abstract**

Consider a steady flow in two-dimensional of a viscous, incompressible Casson nano liquid over a nonlinear penetrable elongated sheet with radiation and chemical reaction. The Casson liquid rheological model is used to explain the non-Newtonian liquid attributes. Similarity variables are utilized to evaluate the governing flow model into set of nonlinear total differential equations. The outcomes of the flow equations were gotten by using Runge-Kutta alongside the shooting techniques. In other to explain the physics of the problem, impact of flow parameters are presented in graphs while computations on engineering curiosity are presented in table. Alike in the Casson liquid term is observed to degenerate the fluid velocity alongside the momentum layer thickness. The impact of the imposed magnetic is felt by decreasing the velocity owing to the Lorentz force.

**Keywords:** Non-Newtonian fluid, elongated sheet, Lorentz force, thermal radiation, Chemical reaction.

**EMEA-AM-140**

**THE CONCENTRATION OF PROSCILLARIDIN AFTER ORAL  
ADMINISTRATION TO MAN STUDIED BY THREE  
COMPARTMENT MATHEMATICAL MODEL**

**Lakshmi Narayan. K.<sup>1</sup>, Sivarama Krishna Reddy. V<sup>2</sup> & Kondala Rao. K.<sup>2</sup>**

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**Abstract**

In this present investigation the concentration of proscillaridin A was studied by three compartment model. The model is characterized by a system of three non-linear ordinary differential equations. The Eigenvalue and the Laplace transform methods were used to solve the system of equations. Proscillaridin 1.5mg was given as a single oral dose, then the plasma concentrations were measured over a period of 24 hours. The transfer coefficients were measured from proscillaridinA concentrations using method of residuals and the variation of proscillaridin A concentration – time curves plotted using MATLAB. In this model we consider excretion is from the blood and intestinal fluid compartments.

**Keywords:** Proscillaridin, Oral administration, Portal venous, Peripheral venous, Blood plasma, Intestinal fluid, cell, Laplace transform, Eigenvalue.

# EMEA-AM-141

## A THREE SPECIES AMMENSALISM MODEL WITH HARVESTING AFFECT ON 1ST AND 2ND SPECIES

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### Abstract

The Present model is devoted to an analytical investigation of affect of Harvesting on three species syn-ecological model during which the species of 1st kind (N1) is ammensal on the species of 2nd kind (N2), the species of 2nd kind (N2) is on the species of 3rd kind (N3) and the species of 3rd kind (N3) is on the species of 1st kind (N1). Here species of 1st kind (N1) and species of 2nd kind (N2) are harvested at a rate proportional to their population sizes. Co-existing state is known and its native stability is mentioned. Solutions of linearized equation are applied. Further, with the help of suitable Lyapunov function global stability was discussed. In support of analytical results, numerical simulation were carried out using Mat Lab.

**Keywords:** Ammensal, Harvesting, Interior Equilibrium Point, Lyapunov's function and Routh-Harwitz criteria.

**EMEA-AM-142**

**Hall and ion slip effects on Unsteady Convective MHD  
Rotating flow of water based Molybdenum disulfide  
Nanofluid**

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**Abstract**

Hall and ion slip effects on MHD free convective rotating flow of water based Molybdenum disulfide nanofluid in a porous medium past a moving vertical semi-infinite flat plate are studied in this article. The equations for governing flow are solved analytically by perturbation method. The effects of different parameters on the flow are discussed through graphs. Outcomes disclose that the impact of thermal convection of nanoparticles has increased the temperature distribution, which helps in destroying the cancer cells during the drug delivery process.

**Keywords:** MoS<sub>2</sub>-water based Nanofluid, Heat transfer, Hall and ion slip effects, Porous medium, Rotating frame.

**EMEA-AM-143**

**Mathematical modeling, interpretation, and simulation of tumor dynamics in the presence of CD4 + cells with chemotherapeutic drug intervention**

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**Abstract**

A tumor is a condition of uncontrolled cell division in solid tissues such as an organ, bone, or muscle. After a sequence of mutations (changes in the genetic sequence), tumor cells normally develop and become progressively abnormal. These mutations in our environment are either hereditary or, more commonly, caused by carcinogens (cancer-causing substances). This abnormal condition of tumor growth evolves a series of mechanisms that can caricature the peripheral immune forbearance and hence escaping the tumoricidal attack by the immune cells. In the present research, we contemplate mocking the roles of various immune cells in tumor attack using the mathematical model formulated. Also, we study the constitution of these various cell densities, involved under our study, by employing drug interventions through diverse therapy techniques. The mathematical model formulated for our study prevails to be unique due to the exemplary composition: tumor cells, natural killers, dendritic cells, CD8+ cells, CD4+ cells, interleukin 2 cytokines (IL-2 cytokines), and drug interference term. The model established is analyzed mathematically for its stability using standard methods. The system of differential equations is solved using an ordinary differential equation solver, with the values of the parameters taken from pathologically tested sources. The cases of with and without drug interference have been analyzed using the graphical results obtained. Also, we intend to study the tumor cell density by changing the frequency of therapy employed. The results followed a hysteresis loop, adding uniqueness to our present work.

**Keywords:** Immune cells, Hysteresis, Cytokines, Stability.

**EMEA-AM-144**

**FRW cosmological models for General Relativistic Hydrodynamics for time varying deceleration parameter**

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**Abstract**

Friedmann–Robertson–Walker (FRW) metric within the presence of General Relativistic Hydrodynamics in the context of General Theory of Relativity is considered. Exact solutions of field equations are obtained using the special form of the average scale factor derived by Abdussattar and Prajapati (2011) by constraining the deceleration parameter and a special form of deceleration parameter by Singh and Debnath (2009). The Phantom, Chaplygin gas and Tachyon fields are discussed.

**Keywords:** FRW, General Relativistic Hydrodynamics, General Relativity.

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**EMEA-AM-145**

**Effect Of Viscous Dissipation, Suction/Injection On Radiative MHD Casson Nano Fluid Flow Over A Nonlinear Stretching Sheet With Chemical Reaction.**

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**Abstract**

Present paper aims to study the impacts of heat absorption, suction/injection on MHD Boundary layer flow of a Casson Nano fluid flow over a nonlinear stretching sheet with viscous dissipation, radiation and chemical reaction. The governing PDE are converted into a set of nonlinear ODE using convenient similarity transformations. The resultant equations are solved numerically using Keller box Scheme. Velocity, temperature, concentration profiles are plotted for various parameters. Magnetic parameter, Casson parameter and suction parameter are having decreasing tendency in velocity profile. Also increasing tendency is observed in temperature profiles for Eckert number, heat source parameter, thermoporesis parameter. For concentration profiles Eckert number and Brownian diffusion parameter shows decreasing tendency whereas suction and heat source parameter are having increasing tendency. Also to validate the numerical method local parameters are calculated using MATLAB and observed that results are found to be good in agreement with the existing literature.



**EMEA-AM-146**

**NUMERICAL SIMULATIONS OF DARCY –FORCHHEIMER  
FLOW EXPLORED WITH CARBON NANOTUBES UNDER  
ACTIVATION ENERGY.**

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**ABSTRACT**

This study presents the computational analysis of three dimensional Darcy -Forchheimer flow concerning the hall current and joule heating with Arrhenius activation energy explored using SWCNT and MWCNT. To do so, the flow equations are modified to a nonlinear system of ODEs after using adequate self-similarity functions. The solution for the modified system is evaluated by numerical techniques with python coding. The results show the impacts of involving variables on flow Characteristics and the outcomes of the friction factors are evaluated as well. In this have a look at, the effects to local Nusselt variety and Sherwood numbers are evaluated. A Favourable comparison is performed with previously available outcomes. The carried out consequences are much like solutions received through other m researchers. The results are presented for flow characteristics in the case of Darcy -Forchheimer flow of nanofluid with different base fluid along with CNT. Velocities are reduced for the SWCNT with different base fluid as compared to MWCNT. Temperature and concentration fields enhances with the hike in the estimations of thermal and concentration Biot number in case of Darcy -Forchheimer flow of nanofluid. Enhancing values of activation energy parameter result in increasing in the concentration boundary layer.

**Keywords:** Activation energy, hall current with ion slip, joule heating, SWCNT, MWCNT, python.

**EMEA-AM-147**

**ANALYZATION OF RADIATION ABSORPTION EFFECT ON  
MAGNETO HYDRO DYNAMICS CASSON FLUID FLOW WITH  
CHEMICAL REACTION AND DIFFUSION-THERMO EFFECTS**

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**ABSTRACT**

This research work is probed Radiation Absorption sway on Casson MHD fluid with Dufour, Hall and radiation effects. It is elucidated with the perturbation prescription for the velocity, the temperature and the concentration. Sherwood number, skin friction and Nusselt number are manifested. The consequences of heterogeneity of parameters like as Schmidt number, Chemical reaction parameter, Radiation parameter, Prandtl number, Radiation Absorption parameter, Dufour parameter, Casson parameter, Grashof number, and Hall current parameters are scrutinized meticulously.

**Keywords:** MHD flow, Hall current, Casson fluid, Dufour effect, Chemical reaction.

**EMEA-AM-148**

**EFFECTS OF HALL CURRENT AND ALIGNED MAGNETIC  
POROUS FLUID FLOW WITH EXPONENTIALLY DECAYING  
WALL TEMPERATURE**

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**ABSTRACT**

The present work aims at hall current and aligned magnetic effects on unsteady MHD natural convection flow of an electrically conducting fluid past a vertical plate with variable temperature in the presence of radiation and heat source is considered. It is supposed that the temperature of the plate decays exponentially with time. Exact solutions to the non dimensionalised coupled linear partial differential equations representing the flow problem are obtained using perturbation method. Effects of different physical parameters involved in the temperature and velocity profiles are investigated, shown graphically and discussed qualitatively. Skin friction and Nusselt number are also derived and their variations with respect to the parameters are investigated. Nusselt number and skin friction are also derived and the effects of different parameters on the flow characteristics are investigated. Graphs are plotted for the validation of results.

***Keywords:***

*Hall Current, Magneto hydro dynamics, Porous medium, Radiation.*

**EMEA-AM-149**

**HEAT AND MASS TRANSFER ENHANCEMENT WITH  
HYDRO NANOFLUID FLOW WITH CHEMICAL REACTION  
AND RADIATION EFFECT**

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**ABSTRACT**

An analysis of mathematical models for boundary layer flow and heat transfer of incompressible hybrid Nanofluid over a surface have been presented with possible applications to industrial products and technological areas. The main contributions of this study to enhance heat transfer rate. In industrial areas have significant roll of Nanofluid with great use due to its high enhancement of heat transfer rate as compare to the thermal conductivity. Hybrid Nanofluid has used nowadays for further enhancement of the heat transfer rate. Numerically, we solve this problem by using Implicit finite difference method which is also known s Keller Box Method and also examine the impact of Chemical reaction and thermal radiation over stretching sheet.

Keywords: Nanofluid , Hybrid Nanofluid, Chemical reaction , Thermal radiation , Keller box method.

**EMEA-AM-150**

**EFFECTS OF VISCOUS DISSIPATION AND THERMAL RADIATION ON AN ELECTRICALLY CONDUCTING CASSON-CARREAU NANOFLUID FLOW WITH CATTANEO-CHRISTOV HEAT FLUX MODEL.**

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**ABSTRACT**

The study is to investigate the Cattaneo-Christov heat flux model on the effects of heat and mass transport of MHD Casson-Carreau nanofluid past an accelerating permeable vertical plate with Soret and Dufour mechanism. The set of PDEs were simplified by applying suitable similarity variables to obtain coupled nonlinear set of ordinary differential equations. To explain the physics of the problem, a spectral base approach called spectral homotopy analysis method (SHAM) was used to solve these set of transformed equations. The set of transformed ODEs are coupled nonlinear, SHAM is an appropriate approach because it helps to decouple the systems of equation and split them into linear and nonlinear set of equations. This study is special because it considers the two non-Newtonian fluids (Casson and Carreau) to flow together through the vertical wall to the boundary layer where the effects of various parameters are critically examined.

**EMEA-AM-151**

**CHEMICAL REACTION AND RADIATION EFFECTS ON MHD  
FREE CONVECTION FLOW PAST AN EXPONENTIALLY  
ACCELERATED VERTICAL POROUS PLATE**

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**ABSTRACT**

The present work investigated the effects of chemical reaction and radiation on MHD flow past an exponentially accelerated vertical plate through porous medium in presence of heat generation/absorption. The flow is assumed to be in x-direction which is taken along the infinite vertical plate in upward direction and y-axis is taken normal to the plate and the plate is exponentially accelerated with velocity  $u = u_0 e^{at}$ . A uniform magnetic field applied normal to the flow. The dimensionless governing equations are unsteady and non linear partial differential equations. The solutions of governing equations are obtained by using perturbation technique. The effects of chemical reaction (Kr), Magnetic parameter (M), radiation parameter (F) on the velocity, temperature and concentration fields are discussed with the help of graphs.

**Keywords:** MHD, Heat generation/absorption, Radiation, Chemical reaction, porous medium.

**EMEA-AM-152**

**EFFECTS OF VARIABLE VISCOSITY, THERMAL RADIATION AND SORET-DUFOUR ON THE FLOW OF NON-NEWTONIAN FLUIDS PAST AN INCLINED THERMALLY-STRATIFIED POROUS MEDIUM**

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**ABSTRACT**

This paper explored the effects of variable viscosity, thermal radiation and Soret-Dufour on the flow of non-Newtonian fluids past an inclined thermally-stratified porous medium under the influence of magnetohydrodynamic (MHD). The flow is set up by considering the buoyancy term to be nonlinear while nano fluids particles are considered within the thermally-stratified medium. Thus, the non-linear PDEs were simplified by utilizing similarity transformation to obtain nonlinear coupled equations. The set of simplified equations are solved by employing spectral homotopy analysis method (SHAM). SHAM utilizes approach of chebyshev pseudospectral alongside the homotopy analysis. Findings shows that, higher value of the the nonlinear convective parameter enhances the velocity profile. A large value of the Casson parameter was found to degenerate the velocity plot. Also, the chemical reaction brings a destructive reaction by decreasing the velocity alongside the concentration plots.

**Keywords:** Variable viscosity, Thermally-Stratified, MHD, Nanofluid, Casson nanofluid, Williamson nanofluid.

**EMEA-AM-153**

**HEAT AND MASS TRANSFER ANALYSIS OF MHD CASSON  
FLUID FLOW OVER A PERMEABLE VERTICAL SURFACE  
WITH THERMAL RADIATION AND NEWTONIAN HEATING**

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ABSTRACT

The present paper describes the heat and mass transfer analysis of MHD Casson fluid flow over a permeable vertical surface with thermal radiation and Newtonian heating. The governing partial differential equations are solved analytically by using Laplace transform technique. The influence of various parameters on velocity, temperature and concentration are presented graphically. Key words: MHD, Casson fluid, Newtonian heating



**EMEA-AM-154**

**UNSTEADY TITANIUM ALLOY WATER BASED NANO FLUID  
PAST AN OSCILLATORY MOVING VERTICAL PERMEABLE  
SEMI-INFINITE FLAT PLATE WITH THERMOPHORESIS  
EFFECT**

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**ABSTRACT**

We investigated the effect of thermo diffusion an unsteady flow of a titanium alloy water based nano fluid. Analytical solution was performed using perturbation scheme. The effects of various non-dimensional governing parameters on temperature, concentration and velocity are negotiated and reported via graphs. Moreover, we observed that an enhance in thermo diffusion causes to rise the velocity and concentration and velocity the thick ness of boundary. Keywords: Thermophoresis, Hall current, inclined surface, Rotation, Chemical Reaction.

**EMEA-AM-155**

**THERMAL AND MASS DIFFUSION IN MHD  
MIXED CONVECTION FLOW**

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**ABSTRACT**

Thermal and mass diffusion in MHD convective flow has been examined in detail in this paper. The influence of various flow entities on the participating parameters is illustrated graphically and discussed in detail. For relatively smaller values of Schmidt number, it is noticed that the concentration decreases. Further, it is observed that as Schmidt number increases the concentration is inversely proportional. In general it is noticed that, as the Prandtl number increases the velocity. When examined in detail, it is noticed that the velocity profiles are parabolic in nature and are widely dispersed as the Prandtl number increases. Also, for a constant value of magnetic field and Prandtl number - the skin friction is observed to be constant.

**Key words:** Magnetic field, Heat and mass transfer, Skin friction

## EMEA-AM-156

# PERCEPTIONS OF USERS OF UDAN SCHEME IN INDIAN CIVIL AVIATION SECTOR

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### Abstract

Government of India Ministry of Civil Aviation released the National Civil Aviation Policy 2016 (NCAP-16), that focuses on making flying affordable to the masses and strengthening the regional air connectivity. One of the objectives of NCAP is to enhance physical support and infrastructure development. To achieve this objective, it is required to establish and integrated ecosystem which will lead to significant growth of the civil aviation sector. In this contest Government of India released a Scheme UDAN (Ude Desh ka Aam Nagarik), which is a regional airport development and regional connectivity scheme (RCS) this scheme is aimed at making air travel affordable and wide spread, there by leading to economic development and employment in all regions of the India. Initially out of the 486 Indian airports 406 were participating in UDAN. The performance of UDAN during last two years needs to be evaluated so as to assesses whether its intended objectives are meet and suggestions for future strategies need to be given. In this contest the present study intended to ascertain the passenger perception about UDAN scheme and ascertain its roll in regional connectivity in India. To achieve this a Random sample of 555, UDAN users were taken and a structured questioner were used to obtain their opinions regarding UDAN implementation. Based on the responses the success and changes faced by UDAN scheme was assessed using descriptive data analytical tools and inferential statistical tools.

**Key words:** UDAN, NCAP, RCS, Shapiro-Wilk, Levene's, Mann-Whitney U test, Likert's scale, Descriptive data tools, Inferential data tools

**EMEA-AM-157**

**CLASSICAL OPTIMIZATION TECHNIQUES LAGRANGIAN  
METHOD & KUHN – TUCKER CONDITIONS**

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**Abstract** In this paper, we shall concern with ourselves with the classical theory of optimization. This paper deals with the use of differential calculus to determine the points of maxima and minima for both unconstrained and constrained continuous functions. Although, in general the classical optimization techniques are not suitable for obtaining numerical solutions except for relatively simple problems, the underlying theory gives the basis for devising most of the non-linear programming algorithm.

**Keywords:** *Non-Linear programming, Lagrangian, Kuhn-Tucker conditions.*

**EMEA-AM-158**

**A NOVEL PARADIGM TO IMPROVE DECISION MAKING  
SYSTEM WITH STATISTICAL MODELS USING TWITTER DATA**

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**Abstract**

This research work deals with a novel paradigm to improve decision making system with statistical models using twitter data. The main goal of this research work is to extract the tweets from the twitter API and analyses the sentiment present in the each tweets. It is explain how the EIA has been changing and what is the sentiment by the tweets extracted from the twitter API. Authors have used twitter tweets on EIA from Twitter API which is used as dataset in this experiment. Authors also compare the sentiment of tweets, it helps to decision making will be lot easier for the user regarding opinions of that particular tweet. In this model will able to predict the sentiment of the tweets without separately finding the polarity of each tweets. Authors can give the tweet into our model and predict the sentiment of the tweet.

**Keywords:** *Statistical Model, Sentimental Analysis, Gradient Boosting Algorithm, decision making system*

**EMEA-AM-159**

## **MACHINE LEARNING MODELS FOR RAINFALL DATA**

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### **Abstract**

Rainfall plays a vital in India for cultivation and drinking purpose. 70% population in India is directly or indirectly depends on cultivation. In this paper, we are used three Machine Learning models such as Decision Stump, M5p and Multilayer Perceptron for Rainfall Data of Coastal Andhra Pradesh, Rayalaseema and Telangana from the year 1988 to 2017. By Measuring Accuracy using Accuracy models such as Mean Absolute Error, Root Mean Square Error, Relative Absolute Error and Root Relative Absolute Error. We choose the best model among these three models

**Keywords:** *Rainfall, Decision Stump, M5p, Multilayer Perceptron, RMSE.*

**EMEA-AM-160**

**A STUDY ON DIRECTED OR UNDIRECTED GAME THEORY IN  
BANKING SECTOR USING BRUTE FORCE ALGORITHM**

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**Abstract**

This paper mostly focused on efficient study of set of rules to trace Brute Force in the interior of a given directed or undirected game theory in Banking Sector. In Theoretical Mathematics, the one of the further most thought-provoking area is directed or undirected game theory. A specialized concept of directed or undirected Game theory results the deal with locating and undirected Game theory is said to be a Game theory models if it is associated with each other. To find a key presentation for the easy to get to investment for the customer to the bank using directed or undirected Game theory.

**Keywords :** *Game theory, Directed Game theory, Undirected Game Theory, Nash equilibrium, Banking sectors, Wireless Sensor Networks*

**EMEA-AM-161**

**BASE STOCK INVENTORY SYSTEM WITH QUALITY  
DEPENDENT DELIVERY TIME**

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**Abstract**

This paper deals with single inventory problem operated by a base stock policy. The demand for the item is explained by Poisson process and supply lead time is a random variable following exponential distribution. The supply lead time is considered to depend on the quality of the product available with the supplier. Whenever the desired quality is not available on shelf, the lead time distribution under goes a drift in mean. The optimum base stock level is determined with the help of M/M/1 queue and the effect of drifted lead time distribution is applied to the cost function. The result of the model is demonstrated with the help of spread sheet template.

**Keywords:** *Inventory, Base Stock, Lead time, Demand.*



## EMEA-AM-162

### ACCURACY OF FORECASTING MODELS USING BOOTSTRAP TEST AND FRIEDMAN'S TEST

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#### Abstract:

In Time Series analysis, theoretical and empirical findings have suggested that integrating various types of forecasting models can be an effective way to improve the predicting performance of each individual model. It is especially occurred when the models in the ensemble are quite different. Hybrid techniques that decay a period arrangement into its linear and nonlinear parts are one of the main sorts of the Hybrid models for the time series predicting. An attempt is made in this paper to forecast the daily prices of silver, gold metals and foreign exchange rates of Indian rupee (INR) against US dollar (USD) using conventional time series models, artificial neural networks (ANN) and Hybrid models to examine the forecasting capability of Hybrid, Neural Networks and Box-Jenkins models using Bootstrap test and Friedman's test. At a glance from the study, the Hybrid model has more accuracy in forecasting the forecasts of various data sets than that of Box-Jenkins and FFNN model.

**Keywords:** ARIMA, FFNN, Hybrid model, Error measures, Bootstrap test, Friedman's test

## EMEA-PH-01

# Effect of Samarium ions concentration on Physical, Optical and Photoluminescence Properties of Oxy-Fluoro Boro Tellurite Glasses

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### **ABSTRACT:**

A new series of samarium ions doped oxy-fluor boro tellurite (OFBT) glasses have been prepared by using conventional melt quench method. Details of functional groups and OH content present in the as prepared un-doped OFBT glass has been thoroughly investigated by using FT-IR spectrum. Thermal analysis of the glasses has been studied using TG-DSC to understand the thermal stability of the as prepared un-doped glass. Several physical properties, optical direct & indirect band gaps and Urbach energies were measured to understand the glass structure using absorption spectral data. From the absorption spectra, the Judd-Ofelt (J-O) intensity parameters are evaluated to know the ligand field environment around the rare earth ion. The photoluminescence spectra recorded for the as prepared glasses show intensified peak at 602 nm. The lifetimes estimated from the PL decay spectral features were coupled with radiative lifetimes to estimate quantum efficiency of the as prepared glasses. The Inokuti-Hirayama (I-H) model applied to the PL decay spectral features reveals the underlying energy transfer mechanism responsible for the conversion of single exponential to non-exponential as dipole-dipole in nature. Reasonably higher values of stimulate emission cross-sections ( $\sigma_{se}$ ) and quantum efficiencies ( $\eta$ ) indicates the suitability of OFBTSm10 glass for lasers applications in orange region.

***Index terms: Samarium, boro tellurite glasses, Judd-Ofelt parameters, Photoluminescence.***

EMEA-PH-02

Sensitization of Er<sup>3+</sup> NIR emission using Yb<sup>3+</sup> ions in alkaline-earth chloro borate glasses for fiber laser and optical fiber amplifier applications

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**ABSTRACT:**

This paper reports on the sensitization of erbium near infrared emission (1.54  $\mu\text{m}$ ) using Yb<sup>3+</sup> as a sensitizer in alkaline-earth chloro borate (AECB) glasses synthesized by using melting quench method. The Er<sup>3+</sup> NIR emission has been observed in the range 1450-1650 nm with intense peak at 1540 nm upon 381 nm excitation. The effect of Yb<sup>3+</sup> ion concentration as sensitizer on NIR emission of Er<sup>3+</sup> doped AECB glasses has been investigated in detailed using the photoluminescence excitation (PLE), PL emission and decay spectral studies. The enhancement in the NIR emission upon varying the Yb<sup>3+</sup> doping ion concentration has been aptly elucidated through an energy level diagram. To check the suitability of these glasses for laser and fiber amplifier applications, the absorption, emission and gain cross-sections are also evaluated. The results obtained contemplates the superior nature of Er<sup>3+</sup> and Yb<sup>3+</sup> co-doped AECB glasses for the laser and fiber amplifier applications.

***Index terms: Near-infrared; Energy transfer; Sensitization; Erbium; Ytterbium.***

**EMEA-PH-03**  
**STUDIES ON OPTICAL PROPERTIES OF PVA BASED**  
**COMPLEX POLYMER ELECTROLYTE**

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**ABSTRACT**

Solid Polymer Electrolytes (SPE) based on polymer (PVA) Polyvinyl Alcohol is doped with Sodium Nitrate ( $\text{NaNO}_3$ ), a membrane is prepared by solution casting technique method. The outcome of the optical transmission, optical absorption, absorption coefficient, optical refractive index, optical extinction coefficient, direct energy band gap, indirect energy bandgap, absorption edge, estimated band gap, optical conductance properties are studied. The optical properties are carried out by UV-visible (Ultraviolet-visible) Absorption spectroscopy wavelength within the range of 200 nm to 800 nm. The optical transmittance wavelength is 200 nm. The calculated energy band gap changes from 5.6eV to 4.9eV. The energy bandgap and optical conductance properties are shown, and the given composition membranes are nearly broadcasting within the visible region range. The direct, indirect and absorption edge for polymer pure PVA is high. increasing salt concentration of  $\text{NaNO}_3$ , the above parameters are decreasing gradually. For the concentration of 70% PVA: 30%  $\text{NaNO}_3$  has low value of direct and indirect energy bandgap.

***Index terms: Solid Polymer electrolyte film, absorption, transmittance, refractive index, absorption coefficient, energy band gap, optical conductance.***

EMEA-PH-04

## Absorbance, Transmittance and Optical Energy Band Gap Studies of TSP:NaNO<sub>3</sub> Based Polymer Electrolyte

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### ABSTRACT

Solid bio-polymer electrolyte (SBPE) material film was synthesized from (TSP) Tamarind Seed Polysaccharide is doped with salt sodium nitrate (NaNO<sub>3</sub>) by solution cast method. Energy band gap studies were observed from UV- visible absorption spectroscopy between 220nm-820nm. Optical transmittance, optical conductance is determined from optical absorption. The optical energy band gap is found from these optical parameters. Optical energy band gap changes from 5.01eV to 4.6 eV for various concentrations of TSP: NaNO<sub>3</sub>. Some of the optical parameters like indirect bandgap and direct band gaps are extremely high and by increasing the dopant salt concentration to host polymer then these parameters are decreased gradually. Finally, the optical band gap of energy had obtained very low value for 70% TSP: 30% NaNO<sub>3</sub>.

*Index terms : Biopolymer TSP, Dopant salt NaNO<sub>3</sub>, optical absorption, optical transmission, optical energy bandgap.*

EMEA-PH-05

## On the ultraviolet B emissions of $\text{CaLaB}_7\text{O}_{13}:\text{Gd}^{3+}$ phosphor

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### ABSTRACT:

$\text{CaLaB}_7\text{O}_{13}$  doped with trivalent gadolinium ( $\text{Gd}^{3+}$ ) ions was prepared by the sol-gel technique with varying concentration of  $\text{Gd}^{3+}$ . X-ray diffraction (XRD) analysis confirmed the formation of the prepared phosphors. The phosphors were characterized by the photoluminescence (PL) spectroscopy, where PL intensity increases by increasing the  $\text{Gd}^{3+}$  ions in the  $\text{CaLaB}_7\text{O}_{13}$  matrix. Emission bands at 307 nm and 313 nm correspond to  ${}^6\text{P}_{5/2} \rightarrow {}^8\text{S}_{7/2}$  and  ${}^6\text{P}_{7/2} \rightarrow {}^8\text{S}_{7/2}$  transitions, respectively. Further, the phosphor with 0.09 mol of  $\text{Gd}^{3+}$  had the highest emission among different concentration of  $\text{Gd}^{3+}$  ions and decreased with further doping. Concentration quenching was owing to multipole-multipole interaction among the dopant ions. The Electron paramagnetic resonance (EPR) spectra confirmed the existence of  $\text{Gd}^{3+}$  ions in the prepared phosphors and exhibit the characteristic gadolinium U type spectrum.

*Index Terms: Sol-gel, EPR,  $\text{Gd}^{3+}$  ions,  $\text{CaLaB}_7\text{O}_{13}$ , Photoluminescence*

EMEA-PH-06

## Luminescence investigations on Dy<sup>3+</sup> doped CdO-PbF<sub>2</sub> phosphate glass-ceramics

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### ABSTRACT:

This paper reports the structural and photoluminescence investigations on Dy<sup>3+</sup> doped transparent CdO-PbF<sub>2</sub> phosphate glass/glass ceramics with SrO. Upon heat treatment, the nanocrystals occurred in glass ceramics are spherical in shape in the sizes of 10nm to 20nm. The luminescence intensities were strongly dependent on nanocrystallinity and showing the same kinetics as efficient luminescent hosts. In the present host, well incorporation of Dy<sup>3+</sup> ions in nanocrystals and low energy transfer to Dy<sup>3+</sup> ions due to existence of other crystalline phases, both the mechanisms occurred. The consequent variations in luminescence intensities also observed.

***Index Terms: Phosphate glass, Glass ceramics, Nanocrystals, Luminescence***

## EMEA-PH-07

# Impact of molecular interactions on binary solutions of 2-propanol with methoxy aniline isomers at different temperatures

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### ABSTRACT:

In this present experiment, thermodynamic fundamental parameters like density( $\rho$ ), speed of sound( $U$ ) were measured for the binary solutions that contains 2-propanol with isomers of 2-methoxy aniline in various concentrations and temperature ranges from 303.15 to 323.15K (5K interval) over ambient atmospheric pressure. The extracted values of excess molar volume ( $V_m^E$ ), and excess isentropic compressibility( $K_s^E$ ) which are derived from experimental fundamental values have been correlated with classical polynomial redlich-kister function. Furthermore, in order to reveal specific interactions which are presented in binary solutions, these excess values have been subjected to reduced redlich-kister function. Furthermore, the calibration of partial molar volumes( $\bar{V}_{1,p,m}$ ) and ( $\bar{V}_{2,p,m}$ ) of composites shows strong interactions in 4-methoxyaniline(1) + 2-propanol(2) than any other composites. In addition, this semblance is well substantiated by FTIR characteristic spectrum of all combinations at various concentrations. Also, ( $\bar{V}_{1,p,m}$ ) and ( $\bar{V}_{2,p,m}$ ) values of all components have been correlated with belda equation to test the applicability.

**Index Terms:** Redlich-Kister functions, partial molar volumes, belda equations and FTIR Spectroscopy.



## EMEA-PH-08

# Investigations of the molecular interactions in piperidinium based Ionic Liquids with water/alcohol at different temperatures

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### ABSTRACT:

In this experimental investigation, the thermodynamic fundamental parameters of density ( $\rho$ ) and speed of sound ( $U$ ) were calibrated for aqueous solution/alcoholic (1-propanol and 2-propanol) solutions of piperidinium based ionic liquids of 1-Butyl-1-methylpiperidinium tetra fluoroborate (BMPiBF<sub>4</sub>) in various concentrations within temperatures from 303.15 to 313.15K. From these experimental determined values, various thermodynamic acoustic parameters of excess molar isentropic compressibility ( $K_{s,m}^E$ ), excess molar volume ( $V_m^E$ ) are expressed in specific and non-specific molecular interactions. Moreover, calibration of the partial molar volume's and partial isentropic compressibility's of both components shows strong interaction in BMPiBF<sub>4</sub> + 2-propanol combination than any other executed binary composites. In addition to this, the FTIR characteristic spectrum of all combinations at different concentrations gives the more promising features such as interaction behavior that helps our analysis to guide the interactions of individual bonds.

***Index Terms:*** Redlich-kister equations with legendre polynomial, partial isentropic compressibility, partial molar volumes, FTIR analysis.

EMEA-PH-09  
**Development of bio-degradable based polymer  
electrolytes for EDLC application**

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**ABSTRACT:**

In this work, bio-degradable blended solid polymer electrolyte (BSPE) films made up of PVA:PS:(CH<sub>3</sub>COO)<sub>2</sub>Mg with different wt% ratios 50:50:00, 40:40:20, 35:35:30 and 30:30:40, prepared using solution casting technique at room temperature. The physical and chemical properties of the prepared BSPE films were done using XRD, FTIR, UV-vis spectroscopy, TGA and SEM techniques. The electrical properties were measured using impedance analyzer. The highest conductivity  $6.28 \times 10^{-4}$  S/cm and the highest energy band gap 3.52 eV observed for the BSPE film with ratio at room temperature was. The charge storage capability of the material was analysed using dielectric analysis. Cyclic voltammetry (CV) analysis of PVA:PS:(CH<sub>3</sub>COO)<sub>2</sub>Mg (35:35:30 wt %) BSPE film showed specific capacitance value as 2 F/g, energy density value as 8.68 W h kg<sup>-1</sup> and power density value as 312 W kg<sup>-1</sup> respectively.

***Index terms: Poly vinyl alcohol (PVA), Potato starch (PS), XRD analysis, Conductivity studies, Dielectric analysis, EDLC super capacitor***

EMEA-PH-10

# Photocatalytic Degradation of Methylene Blue via Cobalt Doped Fe<sub>3</sub>O<sub>4</sub> Nanoparticles

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## ABSTRACT:

Cobalt doped Fe<sub>3</sub>O<sub>4</sub> i.e., CoFe<sub>3</sub>O<sub>4</sub> nanoparticles of different concentrations (0, 0.5, 1.0, 1.5, 2.0, 2.5 mol% were represented as Fe<sub>3</sub>O<sub>4</sub>, CF1, CF2, CF3, CF4, CF5, respectively) were synthesized using a chemical co-precipitation technique. The XRD patterns and FTIR spectra of Co doped Fe<sub>3</sub>O<sub>4</sub> revealed the formation of spinel structure indicating the successful incorporation of cobalt ions with the Fe<sub>3</sub>O<sub>4</sub> structure of the iron ions at octahedral sites. Scanning electron micrographs showed a fine uniform spherical particle. UV spectroscopic analysis showed that cobalt doping in CoFe<sub>3</sub>O<sub>4</sub> nanocomposites influenced the band gap values. These band gap values decreased in the range of 2.76-1.61 eV (direct), 2.53-0.97 eV (indirect) with increase of cobalt content. The activity of CoFe<sub>3</sub>O<sub>4</sub> in photocatalysis was investigated using methylene blue azo dye under visible light. These results depicted that for 1% cobalt doped Fe<sub>3</sub>O<sub>4</sub> novel material photocatalytic activity was enhanced than all other prepared nanomaterials.

*Index terms Fe<sub>3</sub>O<sub>4</sub> nanoparticles, CoFe<sub>3</sub>O<sub>4</sub> nanoparticles, Chemical co-precipitation method*

EMEA-PH-11

**Investigation on the spectroscopic properties and  
luminescence performance of Holmium doped Barium  
Lead Alumino Fluoro Borate glasses for emission of green  
laser applications**

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**Abstract:**

Optically transparent Barium Lead Alumino Fluoro Borate (BaPbAlFB) glasses doped with different concentrations of Ho<sup>3+</sup> ions were prepared by using melt quench technique. Raman spectral studies were conducted to understand the structural groups present in the as prepared BaPbAlFB glasses at room temperature. Spectroscopic investigations such as optical absorption, excitation, emission, and decay measurements were conducted to understand the visible photoluminescence (PL) and lasing potentialities of BaPbAlFB glasses. The bonding parameters ( $\delta$ ) estimated from the absorption spectral features were used to understand the nature of bonding between Ho<sup>3+</sup> ions and the surrounding ligands. The strong visible emission, large, stimulated emission cross-section ( $\sigma_{se}$ ), high branching ratio ( $\beta_R$ ) and relatively good quantum efficiency ( $\eta$ ) obtained for  $^5S_2 \rightarrow ^5I_8$  (green) transition of 1mol% of Ho<sup>3+</sup> ions doped BaPbAlFB glass reveals its suitability in designing and developing visible green lasers.

*Index terms: Holmium, glasses, photoluminescence, emission cross-sections, quantum efficiency, CIE coordinates.*

**EMEA-PH-12**  
**White light emission from Dy<sup>3+</sup>-doped**  
**ZnO+Bi<sub>2</sub>O<sub>3</sub>+BaF<sub>2</sub>+B<sub>2</sub>O<sub>3</sub>+TeO<sub>2</sub> glasses: structural and**  
**spectroscopic properties**

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**Abstract:**

The ZnO+Bi<sub>2</sub>O<sub>3</sub>+BaF<sub>2</sub>+B<sub>2</sub>O<sub>3</sub>+TeO<sub>2</sub> (ZnBiBaBFTe) host glass was prepared by melt quenching technique with the aim of achieving white light emission from Dy<sup>3+</sup> ions. Their structural and spectroscopic properties were systemically investigated by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), UV-Visible absorption, emission spectra and decay times. Judd-Ofelt(J-O) parameters ( $\Omega_\lambda$ ) evaluated from absorption spectrum were utilized to calculate the radiative parameters for <sup>4</sup>F<sub>9/2</sub> level of Dy<sup>3+</sup> ions. The optical **band gap** energy of as-prepared glasses were calculated for the indirect,  $(\alpha hu)^{1/2}$  and direct,  $(\alpha hu)^2$  allowed transitions. The emission spectra of Dy<sup>3+</sup>:ZnBiBaBFTe glasses showed two intense peaks at 575 nm (<sup>4</sup>F<sub>9/2</sub> → <sup>6</sup>H<sub>13/2</sub>) and 481 nm (<sup>4</sup>F<sub>9/2</sub> → <sup>6</sup>H<sub>15/2</sub>) upon 386 nm excitation. The highest emission intensity was observed at 1.0 mol.% of Dy<sup>3+</sup> for <sup>4</sup>F<sub>9/2</sub> → <sup>6</sup>H<sub>13/2</sub> transition and the results are used in conjunction with lifetime measurements to derive spectroscopic parameters for the stimulated emission cross-section ( $25.2 \times 10^{-22}$ , cm<sup>2</sup>), gain bandwidth ( $5.86 \times 10^{-28}$ , cm<sup>3</sup>), and favourable quantum efficiency (74.2%). Moreover, white light can be realized with a CIE coordinates by adjusting the concentration of Dy<sup>3+</sup> ions in ZnBiBaBFTe host glass. Efficient spectroscopic values and realizable white lighting in Dy<sup>3+</sup>-doped ZnBiBaBFTe glasses may have potential applications in laser illumination devices.

***Index terms*** Dy<sup>3+</sup>-doped glasses; XRD; FT-IR; Photoluminescence; decay times; White light

EMEA-PH-13

## Assessment of Aerosol Radiative forcing and their implications to climate change over metropolitan cities in Pakistan from ground-based data

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### ABSTRACT:

To quantitatively estimate and analyse the contribution of different aerosol types to radiative forcing, we thoroughly investigated their optical and radiative properties using the Aerosol Robotic Network (AERONET) data (2007-2018) over two cities in Pakistan. The contribution of inferred aerosol types following the threshold applied for  $FMF_{500}$  versus  $SSA_{440}$  and  $EANG_{440-870}$  versus  $AANG_{440-870}$  were found the highest for pure dust (PUD, 31.90%) followed by polluted continental (POC, 24.77%) types of aerosols, with moderate contribution was recorded for polluted dust (POD, 20.92%), organic carbon dominating (OCD, 11.85%), black carbon dominating (BCD, 8.77%) and the lowest for the non-absorbing (NOA, 1.79%) aerosol type. Seasonally, the mean ( $\pm$ SD) aerosol optical thickness at 440 nm ( $AOT_{440}$ ) was found maximum ( $0.73\pm 0.36$ ) for PUD type in summer and minimum for BCD ( $0.25\pm 0.04$ ) during spring at Karachi. However, the mean ( $\pm$ SD)  $AOT_{440}$  varied from  $0.85\pm 0.25$  during summer to  $0.57\pm 0.30$  in winter at Lahore, with the highest contributions for POC (29.91%) and BCD (22.58%) and the lowest for NOA (5.85%) type of aerosols. The Santa Barbara DISORT Atmospheric Radiative Transfer (SBDART) model revealed the strong presence of BCD aerosol type led to a surface (BOA) and top of atmosphere (TOA) forcing of  $-70.12$ ,  $-99.78 \text{ Wm}^{-2}$  and  $-9.60$ ,  $-19.74 \text{ Wm}^{-2}$ , with an annual heating rate of 2.10 and 2.54  $\text{Kday}^{-1}$ , respectively, at Karachi and Lahore sites.

***Index terms: Aerosol optical thickness; Fine mode fraction; Single scattering albedo; Radiative forcing.***

EMEA-PH-14

# Long-term spatial distributions of optical and microphysical properties of ice cloud fraction inferred from the CALIPSO and reanalysis data

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## **ABSTRACT:**

In the present study, the spatiotemporal and vertical distributions of ice cloud properties and their association with the meteorological variables are analysed for the period 2007-2016 using the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) and Modern Era Retrospective-Analysis for Research (MERRA-2) reanalysis observations. The distribution of ice cloud fraction (ICF) with its peak does not overlap with that of the ice water content (IWC) peak during daytime and night-time due to the sampling bias. Moreover, the vertical distributions of mean IWC exhibited a vaguely “sharp thorn” at an altitude of ~4 km in all seasons at the location of about  $\pm 40^\circ$ , which can be caused by the artifacts. The altitude of the maximum diurnal variation of ICF and IWC decreases as the latitude increases and are more extensive in the NH than SH. Further, it is noted that different ice cloud optical depth (ICOD) presents significant changes observed in their diurnal variations in the heights of peaks. The maximum diurnal difference of ice cloud properties occurs in the tropical regions of the North Hemisphere (NH) during summer. We also investigated the relation between ICOD and the meteorological variables and found that the ICOD values are dependent on the meteorological parameters.

*Index terms Aerosol optical thickness; Fine mode fraction; Single scattering albedo; Radiative forcing.*

**EMEA-PH-15**  
**Synthesis and characterization of BaFe<sub>12</sub>O<sub>19</sub>**  
**nanoparticles**

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**Abstract**

Nanoparticles of BaFe<sub>12</sub>O<sub>19</sub> are synthesized through auto ignition method using high purity precursors. Structural, microstructural and magnetic properties are investigated with the help of XRD, FESEM and PPMS. Synthesized Nanoparticles show different morphologies from elongated nanorods to spherical shape. The role of size and shape of nanoparticles are investigated in magnetic properties. Magnetization studies shows types of magnetic orders are seen in depending on the size and shape. Very small coercive field of around 200 Oe is observed for one system and Electron Spin Resonance study shows the g value is around 2.55. We can say that Shape anisotropy has significant value when compared to other anisotropies present in the nanoparticle systems.

***Index Terms: X-ray diffraction, Nanoparticle and Magnetism.***



EMEA-PH-16  
**Magnetic properties of Nanocrystalline BaFe<sub>12</sub>O<sub>19</sub>  
Systems**

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**Abstract**

Nanoparticles of BaFe<sub>12</sub>O<sub>19</sub> are synthesized through auto ignition method using high purity precursors. Magnetic properties are investigated with the help of Vibration Sample Magnetometer (VSM) with the help of PPMS, Quantum Design. Synthesized Nanoparticles show many kinds of magnetic order with the influence of shape and size. The role of size and shape of nanoparticles are investigated using magnetic measurements. Magnetization studies shows types of magnetic orders are seen in the synthesized nanoparticles. Very small coercive field observed for one particular nanoparticles system and Electron Spin Resonance study shows the g value is around 2.55. We can say that Shape anisotropy plays significant value when compared to other anisotropies present in the nanoparticle systems.

***Index Terms: X-ray diffraction, Nanoparticle and Magnetism.***

EMEA-PH-17

**Effect of Thermal Radiation on a Parabolic flow past in  
the presence of Isothermal vertical plate with uniform  
Mass diffusion**

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**Abstract.**

An abstract result of warm radiation impacts on a wavering stream over an explanatory move of an extreme isothermal perpendicular plate with outfit heat transmission has been determined. The plate fevers as perfectly as the fixation intensity close to the plate are raised uniformly. The dimensionless governing equation has been derived by working Laplace transform technique. The impact of velocity profile and temperature profile are deliberate for various physical criterions like thermal radiation parameter, Grashof number for thermal and mass, Schmidt value and Prandtl value. It is realized that the value of velocity rises up with raising upsides of the warm (or) mass Grashof value. The float is truly turned around with respect to the warm radiation boundary. The results demonstrated that, the used specimen's preparation sequence minimizes the effect of preparation process on the test results. Also, developed fatigue machine ensures very smooth application overloads during the fatigue crack propagation tests without any test disturb.

***Index Terms: Rotation, parabolic, thermal radiation, vertical plate***

**EMEA-PH-18**  
**A Parabolic started vertical plate on MHD in the presence  
of rotation with uniform mass diffusion on thermal  
radiation**

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**Abstract**

A hypothetical value of an MHD parabolic started perpendicular plate along with the existence of rotation with unvarying mass dispersion on thermal radiation. The heat of the plate is raised to  $T'w$  and the center level close to the plate is in like way raised to  $C'w$ . The plate hotness along with the concentration point next to the plate is lifted consistently. The dimensionless equation has been comprehended by applying the Laplace transform technique. This Analytic method of the issue tackled with the limit condition for heat and fixation is one with thermal radiation. The interpretation for temperature profile, concentration, and the velocity profile is used for several physical criteria like Grashof number for both thermal and mass, thermal radiation parameter, prandtl number, as well as Schmidt number. It is realized that the value of velocity rises up with raising upsides of the warm (or) mass Grashof value. The float is truly turned around with respect to the warm radiation boundary. It is noticed that the value of velocity steps up along mounting ideals of grashof number for thermal (or) grashof number for mass. The vogue is presently inverted with abiding by the thermal radiation parameter.

***Index Terms: Thermal radiation, Parabolic, thermal Grashof value, mass Grashof value.***

## EMEA-PH-19

# A Review On Types of Physical Vapour Deposition Techniques for synthesis of Thin Film and their Applications

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### ABSTRACT

The synthesis process differs from one material to another. In Nanotechnology various procedures are adopted for the synthesis of materials to bring to the Nanoscale range, in this process synthesis output are in form of powder, gel, sheets, thin films, etc, and the structural morphologies like 2D, 3D are good enough for their applications, due to the high surface area and dimensionality film and sheet-like structural morphologies holding good in many applications, these morphologies are analyzed through SEM, TEM characterization. The basic preparation of thin films is dependent on the source of vaporization, in the present situation various deposition techniques are used to fabricate thin films, among these techniques Physical Vapour Deposition technique is widely used for the preparation of thin films. A small attempt was made to explain the deposition techniques, advantages and disadvantages and applications as per the knowledge and from collected data.

*Index terms: thin film, PVD, applications*

**EMEA-PH-20**  
**Micro structural investigation from X-Ray peak profile analysis by  
Williamson- Hall models – A review**

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**ABSTRACT**

The present study explores a review on the analysis of peak broadening in XRD used to evaluate the microstructural parameters like the average crystallite size, lattice strain by Williamson-Hall (W-H), and modified Williamson- Hall (MW-H) models. Williamson-Hall proposed that the intrinsic peak broadening is due to internal stress and the finite size of the coherent scattering region in the sample we considered. Here the importance of the individual contribution of microstructural parameters such as lattice microstrain and average crystallite size for the broadening of the peak in the XRD has been discussed. In the literature, a similar analysis had reported in a few other methods such as Size Strain Plot (SSP), Halder-Wagner Langford (HWL), Warren- Averbach, Balzer, and Enzo. However, W-H and MW-H models are more simplified and standard due to the results depicted from these models are inter-correlated with the Scherrer formula, which indicates that the lattice strain influences the size of crystallite. It confirms intrinsic physical line broadening in the XRD pattern, line broadening is due to two parameters one is crystallite size, and the other one is the presence of microstrain. This analysis highlights the importance of micro structural parameters in the XRD peak broadening.

***Index terms: W-H model, MW-H models, micro structural parameters, XPPA and XRD.***

EMEA-PH-21

# Structural, Electrical and electrochemical studies on doubly doped $\text{LiMn}_{2-x}(\text{NdAl})_x\text{O}_4$ cathode materials for Li-ion batteries

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## ABSTRACT:

Nowadays most of the researchers have focused on high voltage active cathode materials for the development of lithium ion batteries due to their excellent electrical and electrochemical properties. For the past few decades, a wide interest has developed towards the lithium-ion batteries. Due to the production of high voltage and rechargeability lithium-ion batteries, usage became essential in many applications such as mobile phones, digital cameras and laptops, etc. At first rechargeable batteries were introduced with the combination of non-aqueous electrolyte, carbon and lithium cobalt oxide ( $\text{LiCoO}_2$ ) which has given high performance with long durability.

Since 1980, various types of oxide compounds based on transition-metal elements such as  $\text{CoO}_2$ ,  $\text{Mn}_2\text{O}_4$  and  $\text{MPO}_4$  have been introduced as a dopant in lithium-ion batteries because  $\text{Li}^+$  ions have large ionic mobility and transfer the energy at the electrode–electrolyte interfaces. The manganese spinel cathode  $\text{LiMn}_2\text{O}_4$  has been used in the first generation of plug-in hybrid electric vehicles or electric vehicles due to high operating voltage, giving rise to mixed  $\text{Mn}^{3+}$  and  $\text{Mn}^{4+}$  ions in the lattice, which improve rate capability with dual doping of rare earth and transition elements.

***Index terms:: Charge-discharge, XRD, Lithium-ion, Batteries, Solid electrolytes***

EMEA-PH-22

# Numerical Investigation and Optimization of Aerodynamic Effect on Solar Panels at High Altitudes in Urban Environment

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## **ABSTRACT:**

Growing need of power raises the necessity of looking for sustainable energy resources to utilize the Nature's free sources to consume and utilize the energy released by the sun such energy is utilized using solar panels. Growing urban culture and cities there is much greater possibilities that solar panels play an important role in power cities and buildings in this paper we attempted to study the pressure profiles and drag profiles of a traditional rectangular solar panel to overcome the dislocations and optimal placement problems. Dislocations due to air velocity and drag are the major concerns among the solar panel manufacturers. The current study deals with analyzing Aerodynamic scenarios to optimize drag and angular placement to achieve this a computational fluid dynamics study is carried out with a mathematical model where a 5 storey building is assumed to see the affect of flow past solar panel and the pressure patterns on the solar panels. Two different analysis is carried out with changing wind velocities and angles, initial angle of 0 degrees which is normal to the flow direction is solved for 5 m/s and 25 m/s wind speeds and there by changing the orientation of Panels to 45 degree inclination to investigate the Aerodynamic effects on the panels. Depending on the results obtained a futuristic Panel design will be proposed which can be optimum power generation and also aerodynamically effective.

***Index terms:* Solar Panel , Aero Dynamics , Urban Environment , Optimisation.**

EMEA-PH-23

# Impact on Fine Particulate Matter Pollution associated with Surface Synoptic Meteorology through Conceptual Schemas over East China

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## **ABSTRACT:**

In the present study, the characteristics of weather conditions and local meteorological variables over the Beijing-Tianjin-Hebei (BTH) and the Yangtze River Delta (YRD) regions in the winter are analysed using the principal component analysis (PCA) method and daily PM<sub>2.5</sub> accumulation rate. During the Type 1 synoptic weather pattern, China is under the influence of the Siberian High and northerly winds prevail; this situation is beneficial to the transport of pollutants from north to south. However, when the Siberian High is weak, southerly winds prevail which may result in the transport of pollutants from south to north. The Type 2 weather pattern refers to a weak high-pressure located in the BTH resulting in the accumulation of pollutants. During the Type 3 weather pattern, an intense cold Siberian High move to the south and affects the northern areas of China. During the Type 4 weather condition, the weak Siberian High is blocked by the northeast cold vortex and moves toward the south, causing the accumulation of pollution in the YRD. The PCA model shows that there are two transport pathways for pollutants to the BTH (YRD) area: one from the YRD (BTH) and Shandong during Type 1 and Type 2 (Type 1 and Type 3) situations; the other one from the central provinces during Type 4 (Type 1 and Type 4).

***Index terms: Aerosol optical thickness; Fine mode fraction; Single scattering albedo; Radiative forcing.***



EMEA-PH-24

## Hydrogen annealing effect Zinc Oxide nanoparticles

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### ABSTRACT:

The unique physical and chemical properties like high chemical stability, broad range of radiation absorption of ZnO has brought out the preference towards nanoscale electronic and optoelectronic device applications. The dielectric studies are concerned with storage and dissipation of electrical energy which helps to improve the design and quality of the devices. The recent study on ZnO nanostructures leads to quick developments in the microwave telecommunications; satellite broadcasting, discrete & multilayer capacitors and dynamic random access have a choice to find efficient material with high dielectric constant and low dielectric loss.

The hydrogen annealing effects on the structure and dielectric behavior of ZnO samples were studied. The XRD studies show that the crystal size of ZnO nanoparticles was increased due to the increase of annealing temperature from 400 °C to 850 °C, whereas further annealing at 400 °C in hydrogen atmosphere not affected. A small peak shift was observed in hydrogen annealed ZnO samples. The dielectric studies disclose the fact that the hydrogen annealing significantly increased the dielectric constant and ac conductivity values which is due to the hydrogen occupancy in the position of oxygen vacancy.

***Index terms: Hydrogen annealing, Dielectric loss, nanoparticles, ZnO, XRD***



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