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3.2.2.1 - Total Number of books and chapters in edited volumes / books  
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Response :-

3.2.2.1 - Total Number of books and chapters in edited volumes / books  
Published and papers in national / international conference  
proceedings during the year ( 2023-2024 )

Year	Number
2023-24	02

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26-27 July 2023

# SOUVENIR

National Seminar  
on  
Recent Trends in  
Mathematics, Physics and  
Computer Science  
(Multidisciplinary Researches)  
(RTMPCS-2023)



Organised By  
Department of Mathematics, Physics & Computer Science  
Government Bilasa Girls P.G. College Bilaspur (C.G.)

GOVT. BILASA GIRLS P.G. COLLEGE  
BILASPUR (C.G.)

## Basic and Applied Science, Engineering & Technology

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### Abstract

The aim of this paper is to introduce a new system of Wiener - Hopf equation (SWHE) defined on a real Hilbert space. We study the system of nonlinear variational inequality problem on real Hilbert space. we consider a system of new fractional order Wiener-Hopf dynamical system (SFOWHDS) for system of nonlinear variational inequalities problem (SNVIP) using the Wiener-Hopf equations technique. Moreover, the existence of a solution to such a fractional order Wiener -Hopf dynamical system is considered and there is demonstrated a systemic solution to such a dynamical system. We show that the solution of system of fractional order Wiener-Hopf dynamical system is exist and unique . This type dynamical system is interesting to study because it can be apply in the various real world problems.

**Keywords:-** Variational inequality problem, fractional derivative, Wiener- Hope equation, projected dynamical system, , Lipschitz continuous mapping, non-expansive mapping, exponentially stability.

**Government Bilasa Girls' P. G. Autonomous College Bilaspur (Chhattisgarh)**

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**Two-Day National Seminar**

On


**"Recent trends in Mathematics, Physics and Computer Science"**


(Multidisciplinary Researches)


**26-27 July 2023**

**CERTIFICATE**

This is to certify that Mr./Mrs./Ms./Dr. Dr. Prakash Dewangan Designation Asst. Professor  
Institute Indira Gandhi Govt. College Pandaria Distt. Kabildhar has participated/delivered an  
invited talk/chaired a session/ presented a paper/published research paper entitled Fractional order Wiener Hopf  
Dynamical System & System of Non-linear variational Inequality Problem in the National Seminar on "Recent trends in  
Mathematics, Physics and Computer Science" (Multidisciplinary Researches) Organized by the Department of Mathematics,  
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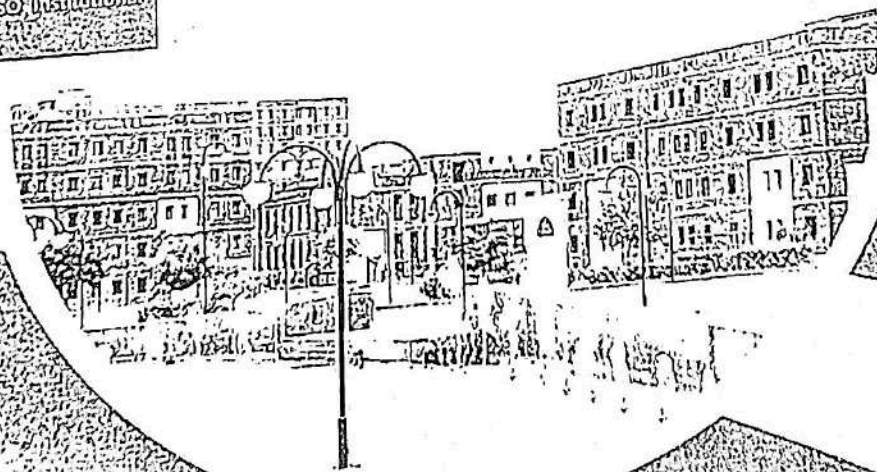
6th International Conference on Mathematical Modelling,  
Applied Analysis and Computation-2023

# ICMMAAC-23

August 03-05, 2023

**"1"**  
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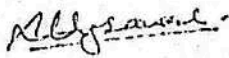


It is heartening to be associated with the conduct of "6th International Conference on Mathematical Modelling, Applied Analysis and Computation - 2023" in JECRC University, Jaipur from 3<sup>rd</sup> to 5<sup>th</sup> August, 2023.

I feel pleasure to extend a warm welcome to all the delegates and keynote speakers of ICMMAAC-23. The conference covers many interesting aspects of Mathematics including mathematical modelling, mathematical sciences, computing and recent developments among other topics.

I believe that the discussions in this conference are of great importance for everyone from the young scholars to the renowned mathematicians.

I express my best wishes to the organizers for the grand success of this event.



(S.L. Agrawal)

problems and resolvent equations to show the existence of a solution. In addition, we create an iterative algorithm for the convergence of resolvent equations and solving generalized set-valued variational inclusion problems. An example has also been provided to support the main result.  
**Keywords and Phrases:** Monotone mapping; Variational Inclusions; Iterative algorithm; Resolvent operator; Semi-inner product space.

\*\*\*\*\*

Paper ID: ICMMAAC-23-020  
**Anti - Intuitionistic Fuzzy Soft Modules in BCK/BCI- algebras**

Dildar Singh Tandon<sup>1</sup>, C. S. Rathore<sup>2\*</sup> and Omprakash Dewangan<sup>3</sup>

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**Abstract:** The authors, Dalmurugan et al., have introduced the notion of anti-intuitionistic fuzzy soft ideals in BCK/BCI algebra. In this article, anti-intuitionistic fuzzy soft modules in BCK/BCI - algebras introduced and some of their properties are discussed.

**Keywords:** BCK/BCI - algebra, Anti - intuitionistic fuzzy soft set, Anti - intuitionistic fuzzy soft BCK/BCI - algebra, Anti - intuitionistic fuzzy soft modules.

\*\*\*\*\*

Paper ID: ICMMAAC-23-021  
**Effect of magnetic-field modulation on the instability of micropolar nanofluid filled within Hele-Shaw cell**

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**Abstract:** The current article examines the effect of magnetic-field modulation on the instability of micropolar nanofluid filled within Hele-Shaw cell using both nonlinear and linear ways. Nonlinear stability analysis is carried out using the truncated Fourier series method while normal mode methodology is utilized to perform to evaluation of linear stability analytically. The outcomes are all displayed graphically. The findings show that the micropolar parameter, magnetic Chandrasekhar number, Hele-Shaw number and the coefficient of coupling between vorticity and spin effect has stabilize effect in the system. On the other hand nanoparticle Rayleigh number promote the commencement of convective motion within the system. Some parameters play a significant influence in the transport of heat/mass in non-linear analysis. The Hele-Shaw number, micropolar parameter, magnetic Prandtl number and magnetic Chandrasekhar number play a crucial role in the heat/mass transfer in the system.

**Keywords:** Hele-Shaw cell; Magnetic-field modulation; Micropolar nanofluid; linear and non-linear analysis.

\*\*\*\*\*

Paper ID: ICMMAAC-23-022  
**The combinatorial impact of through-flow and G-jitter on instability exploration of a rotating layer of nano-liquid with the magnetic field**

Anish Kumar<sup>1\*</sup>, B.S. Bhadauria, Brijesh Kumar Singh, Awanish Kumar

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**Abstract:** In the present article, we investigate the impact of gravity modulation and through-flow on the instability of magneto-convection in a rotating layer of nano-liquid. The heat transfer efficiency of nano-liquids is much higher than that of ordinary liquids and therefore they can work as an excellent coolant in various industries where cooling is a challenge. Normal mode method and a two-term Fourier series procedure have been used for linear/non-linear stability analysis respectively. In linear analysis, we found the impact of many parameters on the initiation of convection. Through-flow has a dual impact on the system. Magnetic Chandrasekhar number and Taylor number both have stabilizing effects. Magnetic Prandtl number do not affect


## Convergence analysis of proportional-derivative -type ILC for linear continuous constant time delay switched systems with observation noise and state uncertainties

Document Type : Research Paper

### Author

Omprakash Dewangan  

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 10.22098/JHS.2023.2808

### Abstract

This article is concerned with the linear continuous time delay switching system with state uncertainties and observation noise. The goal of this study is to investigate how an internal switching mechanism and the efficacy of a conventional proportional-derivative ILC method is impacted by ambient noise for linear continuous-time switching systems. The findings demonstrate that learning gains and the dynamics of the subsystems, rather than the time-driven switching rule, are primarily responsible for the convergence and robustness of the control method. An appropriate selection of learning gains can ensure the control algorithm's convergence and resilience given any arbitrary time-varying switching rule.

### Keywords

Iterative learning control ; switched system ; dynamical system ; time delay ; bounded state disturbance ; bounded observation noise

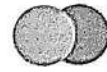


National Conference

on

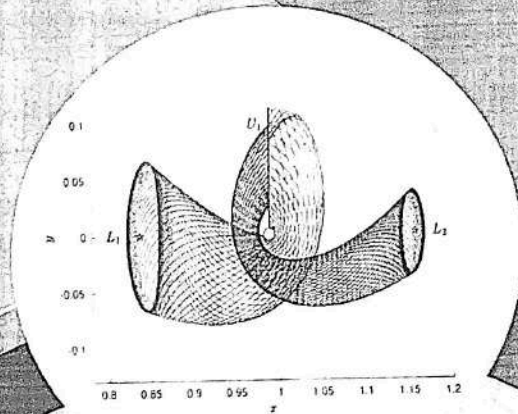
# Modeling, Analysis & Simulation

(Comprising the realms of AI, ML and IoT)



June 28-30, 2024

Souvenir-cum-Abstracts



Organized by :

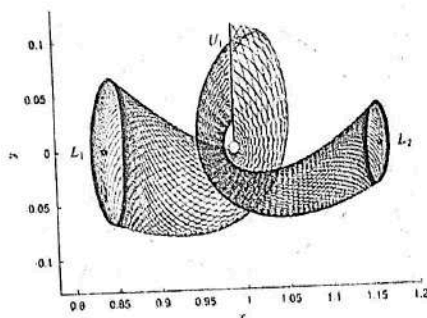


Department of Mathematics & Computing  
Indian Institute of Technology (ISM), Dhanbad  
Jharkhand-826004

National Conference  
on  
**Modeling, Analysis & Simulation**  
(Comprising the realms of AI, ML and IoT)



June 28-30, 2024



Souvenir-cum-Abstracts

Organized by :



Department of Mathematics & Computing  
Indian Institute of Technology (ISM), Dhanbad  
Jharkhand-826004



## Welcome Message

A warm welcome to all the esteemed speakers, delegates and student participants to this three days National Conference on Modeling Analysis and Simulation (Comprising the realms of AI, ML, and IoT): MAS-2024 being organized by the Department of Mathematics & Computing at IIT(ISM) Dhanbad during 28–30 June, 2024.

Present studies in Science and Engineering are majorly focused on application based research, in which methods of Applied Mathematics along with AI and ML are playing a vital role. Artificial intelligence (AI) & machine learning (ML) have transformed many research areas in recent years. In this light, it has become a need of hour to offer a national platform to young researchers to discuss and deliberate topics on Modeling, Analysis, and Simulation comprising the realms of AI, ML, and IoT. These frameworks align with national priorities, offering solutions to complex challenges and advancing science and technology. The conference will serve as a platform for networking, collaboration, and knowledge exchange, for young researchers to interact with the experts and to exchange research ideas. We believe that this conference will provide meaningful strides in academic and research careers of the participants.

We've dedicated our efforts to assembling distinguished speakers in Mathematical Modeling, Numerical Analysis & Simulation, Fluid Dynamics, Scientific Computing, and Data Science from leading institutes and research organizations across India. We believe that the young participants will be greatly benefited by interacting with our eminent speakers. Let's come together, collaborate, learn, and inspire each other to make a significant mark in the field of modeling, analysis, and simulation. We are looking forward to engaging discussions and valuable outcomes throughout the conference. We extend our sincere gratitude to all the delegates for their invaluable contributions. We wish all the participants a pleasant stay at IIT (ISM) Dhanbad and eagerly anticipate the success of MAS-2024.



Prof. Sanjeev Anand Sahu  
Convener, MAS-2024  
IIT (ISM) Dhanbad



Prof. Atul Kumar Verma  
Organizing Secretary, MAS-2024  
IIT (ISM) Dhanbad



National Conference on Modeling, Analysis & Simulation (Comprising the realms of AI, ML and IoT), IIT (ISM) Dhanbad, June 28-30, 2024

MAS  
2024



प्रो. सुकुमार मिश्रा  
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Director

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Indian Institute of Technology (Indian School of Mines), Dhanbad  
Dhanbad-826004, Jharkhand, India



## Message

It is a matter of great pleasure for me to welcome you all to the National Conference on *Modeling Analysis and Simulation* (Comprising the realms of AI, ML, and IoT): MAS-2024 organized by Department of Mathematics & Computing IIT(ISM) Dhanbad during 28-30 June 2024.

Conferences like MAS-2024 bring together researchers, scholars, and professionals to share knowledge and discuss ideas. This event is more than just a meeting, it's a celebration of our shared pursuit of knowledge and collaboration beyond borders. It is testament to the importance of Mathematical Modeling and highlighting the need to tackle challenges and make the most of opportunities it provides.

At Indian Institute of Technology (ISM) Dhanbad we have always taken pride in our commitment to research and innovation. In present scenario of interdisciplinary research Mathematical Modeling is relevant across various disciplines as it helps to represent and analyze real-world phenomena.

I encourage each participants to actively engage in deliberations and absorb the collective wisdom of this esteemed gathering. I sincerely offer my earnest gratitude to those who have contributed through their research papers at the conference. I believe the next three days will be filled with interesting talks, discussions, and chances to connect with fellow participants. As you explore the different sessions and engage with your peers, I hope you gain inspiration and vision to see things from fresh perspectives. I am sure that the conference would achieve its objective by providing a suitable platform for learning and experiencing the latest advancement in Modeling Analysis and Simulation.

Our institute is proud to be the host of this intellectual gathering, and we're grateful to everyone who worked hard to make Conference MAS-2024 happen. I wish for the grand success of the conference.

  
(Prof. Sukumar Mishra)

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National Conference on Modeling, Analysis & Simulation (Comprising the realms of AI, ML and IoT), IIT (ISM) Dhanbad, June 28-30, 2024



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Dhanbad, Jharkhand, India, Pin-826004

(An Institute of nation Importance under Ministry of Education, Govt. of India)



### Message by Chairman MAS-2024

As the Head of the Department of Mathematics & Computing and Chairman of MAS-2024, I am delighted to extend my warmest greetings and heartfelt appreciations to all the eminent speakers, participants and sponsors for their dedicated support in making this National Conference on *Modeling Analysis and Simulation (Comprising the realms of AI, ML, and IoT)*: MAS-2024 a reality. It brings me great pride that our Department is hosting this event.

In an era, where modeling is an ever-evolving field with complex challenges and data is considered the new gold, MAS serves as the alchemy that transforms raw information into valuable insights. Our conference will delve into how mathematical modeling plays a pivotal role and combined with AI, ML, and IoT, can redefine our world. It provides a crucial platform for sharing knowledge, fostering innovation, and promoting collaboration among researchers, educators and students.

The versatility of MAS lies in its ability to bridge the gap between theoretical models and practical applications. By integrating AI's cognitive capabilities, ML's learning algorithms, and IoT's connectivity, we can develop systems that are not only intelligent but also adaptive and resilient. This convergence creates a synergy that drives innovation and fosters sustainable development. As we advance, ethical considerations must remain at the forefront. The integrity of our models and the fairness of our algorithms are crucial. We must ensure that our technological progress promotes transparency, equity, and social good. Our responsibility is to build systems that are as just as they are advanced.

MAS 2024 is not merely a conference; it is a platform for intellectual exchange, collaboration, and innovation. It is an opportunity to engage with leading minds, share pioneering ideas, and embark on a collective journey towards unlocking the full potential of the most impactful invention ever witnessed. The relevance lies in its ability to offer insights, test hypotheses, and guide practical applications, contributing to advancements and problem-solving in diverse domains.

To the young and aspiring innovators/researchers, I urge you to approach this opportunity with enthusiasm and inquisitiveness. Your creativity and vision are the catalysts for future breakthroughs. Embrace the complexity, and let your ideas shape the future. Join us at MAS 2024 to transform data into insights, challenges into opportunities, and ideas into reality. Together, we will chart a course towards a future that is Mathematically/technologically advanced, ethically sound, and universally beneficial.

Wishing all attendees a pleasant and productive time at the event. I wish a grand success to MAS-2024.

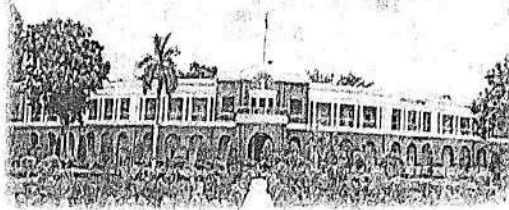
(Prof. R. K. Upadhyay)  
Head, Mathematics & Computing

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## About IIT (ISM) Dhanbad



IIT (ISM) stands as a fully residential technical institute equipped with modern amenities, situated in the mineral-rich belt of India in the city of Dhanbad, Jharkhand. Established in 1926, it drew inspiration from the Royal School of Mines, London. Originally conceived to provide mining education, it has evolved into an internationally acclaimed technical institution. Presently, it offers a diverse range of programs, including B. Tech, M. Tech, Integrated M. Tech., M.Sc., MBA, and Ph.D. Admission for undergraduate students is conducted through the Joint Entrance Examination (JEE-Advanced), while postgraduate admissions are facilitated through the JAM/GATE entrance exams.

## About Department



The Department of Mathematics and Computing offers an exceptional research environment complemented with high-quality teaching, fostering the academic and industrial success of its students. Throughout the preceding decades, the department has showcased its proficiency and excellence in both teaching and research across core mathematical disciplines and related fields, including Mechanics of Solids and Fluid, Dynamical Systems, Statistical Mechanics, Particulate Dynamics, Graph Theory, Bioinformatics, and Artificial Intelligence.

The department offers academic programs leading to the conferment of degrees such as M.Sc. (Mathematics and Computing), Integrated M. Tech (Mathematics and Computing), M. Tech. (Data Analytics), and Ph.D. It actively engages in various sponsored projects from esteemed organizations such as CSIR, NBHM, ISRO, DST, etc. The department is well recognized by the external funding agencies with SAP-DRS provided by UGC and FIST provided by DST. The Society of Applied Mathematics (SAM) and the Society for Industrial and Applied Mathematics (SIAM) student chapter has been established in the department to promote the academic and research activities especially among the young researchers and student.



## Intuitionistic Fuzzy Characteristic Modules of $\Gamma$ -Ring

Dildar Singh Tandon<sup>1</sup>, Aradhana Sharma<sup>2\*</sup> and Omprakash Dewangan<sup>3\*</sup>

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Department of Mathematics, Govt. Bilasa Girl's PG College Bilaspur, Chhattisgarh, India<sup>2\*</sup>  
Department of Mathematics, Indira Gandhi Govt. College Pandariya, Chhattisgarh, India<sup>3\*</sup>  
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### Abstract:

In this article, we focus on intuitionistic fuzzy characteristic modules of  $\Gamma$ -ring (IFCTM), which is generalization of  $\Gamma$ -module in the ordinary module theory. Certain fundamental features of intuitionistic fuzzy characteristic modules of  $\Gamma$ -rings, upper and lower  $\alpha$ -level cut; homomorphism, image and inverse image of IFCTM are discussed.

**Keywords:**  $\Gamma$ -ring,  $\Gamma$ -module, Fuzzy  $\Gamma$ -module, Intuitionistic fuzzy  $\Gamma$ -module.

## Dynamics of Polarized Shear Waves in Sandwiched Structure

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### Abstract

This study focuses on the surface wave propagation in a fluid-saturated porous media that lies between a heterogeneous isotropic half-space and a magneto-elastic self-reinforced medium. The frequency equation of surface wave has been determined and particular cases with numerical outcomes have been analyzed. The frequency equation reduces to the classical Love wave equation in the absence of heterogeneity, magnetic field, self-reinforcement, and porosity. Graphs have been used to illustrate the effects of anisotropy (heterogeneity, magneto-elastic, reinforcement) on phase velocity and anisotropy has been found in the favor of considered wave.

**Keywords:** Surface wave, Anisotropy, Heterogeneity, Magneto-elastic, Self-reinforcement, Porosity.