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RAMSA 2024

7th International Conference on Recent Advances in Mathematical Sciences and its Applications-2024

ABSTRACT BOOK

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RAMSA-2024

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About RAMSA-24

The Department of Mathematics at JIIT Noida is pleased to announce the upcoming 7th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2024), scheduled to be held from February 29th to March 2nd, 2024. The conference aims to assemble esteemed mathematicians, scientists, engineers, researchers from industry, and scholars, facilitating a platform for the exchange of ideas and discussions on recent advancements across various areas of mathematics.

RAMSA-2024 provides an opportunity to delve into research findings and new breakthroughs in mathematics, sciences, and engineering. It serves as a forum to address practical challenges encountered in different application domains and explore potential solutions. Additionally, the conference aims to foster collaboration among researchers, both domestically and internationally.

The scientific program will feature keynote and plenary talks, as well as parallel contributed presentation sessions, with a primary focus on the significant implications of applied mathematics across diverse engineering and scientific domains.

Topics of interest include, but are not limited to:

- Algebra and Its Applications
- Analysis and Approximation Theory
- Coding, Cryptography, and Information Theory
- Computational Fluid Dynamics
- Computer Graphics & Animation
- Continuum Mechanics and Vibrations
- Differential Equations and Applications
- Discrete Mathematical Structures
- Fixed Point Theory
- Fractals, Chaos, and Dynamical Systems
- Fuzzy Mathematics and Logic
- Image Processing
- Numerical Analysis
- Optimization and Its Applications
- Probability, Statistics, and Stochastic Processes
- Theory of Computation
- Wave Propagation
- Wavelets and Applications

We eagerly anticipate your participation and the valuable insights to be shared at RAMSA-2024.

About the Conference Organizer

About the Institute

Founded in 2001, the Jaypee Institute of Information Technology (JIIT) in Noida stands as a renowned institution esteemed for its dedication to excellence in education, research, and innovation. JIIT boasts an enrollment of approximately 9000 students across various programs, including BTech, BSc, BCA, BBA, MTech, MSc, MBA, and PhD, supported by a faculty of about 350 members. The JIIT establishment encompasses cutting-edge facilities such as VLSI, 5G, Biotechnology, and Material Science Laboratories, alongside a state-of-the-art digital learning center, a high-performance computing facility known as the Ramanujan Universe, and the RIDE-Innovation hub.

Strategically located in the National Capital Region (NCR), the JIIT campus is outfitted with modern amenities, advanced laboratories, and hosts a diverse and dynamic student community. With a steadfast focus on technology and innovation, JIIT Noida has consistently ranked among the premier engineering and technology institutions in India. We take great pride in nurturing talent and fostering an environment where students are encouraged to explore the frontiers of knowledge.

About the Host Department

Mathematics serves as a cornerstone in the advancement of modern sciences, engineering, management, and various other critical domains of activity. With this recognition, the Department of Mathematics was established from the very inception of our institute. Beginning with a solitary faculty member, the department has grown into a robust team comprising 31 academicians of professors, associate professors, and assistant professors. This evolution underscores the pivotal role mathematics now plays as an essential enabler and tool in the arsenal of engineers, researchers, and managers.

The department's vision is cantered on achieving excellence in both teaching and research within the realm of mathematics and its applications. The department's primary focus in the realm of research lies in offering both full-time and part-time PhD programs in a diverse range of mathematical disciplines. In addition to fulfilling the foundational requirements of various B.Tech./M.Tech. programs, the department has introduced a M.Sc. program in Mathematics starting from the academic year 2019-2020, followed by a B.Sc. program commencing from the academic year 2022-2023. The significance and utilization of mathematics have seen a substantial surge over the past decade, particularly with the advent of the information revolution, which has catalysed significant changes across multiple disciplines. Consequently, the department faces augmented expectations concerning teaching, research, and practical applications, with computational mathematics skills now

more imperative than ever before. In response, a host of new courses, both core and elective, have been developed and implemented at both graduate and postgraduate levels.

However, the landscape of mathematics continues to evolve in tandem with the ever-changing needs and challenges encountered by its practitioners. Thus, there exists a continual imperative for self-upgradation through research endeavours, workshops, faculty development programs, guest lectures, and conferences. The department endeavours to foster interdisciplinary collaboration by introducing courses of interdisciplinary nature such as Wavelets, Computer Graphics, Finite Element Methods, Image and Signal Processing, among others. With a balanced blend of pure and applied mathematics, the department cultivates a vibrant research environment.

The faculty members of the department are actively engaged in three primary research groups:

1. Fractals & Chaos and Mathematical Analysis
2. Numerical Analysis and Computational Continuum Mechanics
3. Statistics, Fuzzy, Information Theory, and Operations Research.

About the Previous RAMSA Conferences

Brief Report: "1st International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2016)"

The Department of Mathematics, Jaypee Institute of Information Technology. Noida (UP) has successfully organized its first International Conference on Recess Advances in Mathematical Sciences and its Applications (RAMSA-2016) during December 08-10, 2016. The theme of the conference included almost all active research areas in pure, applied, and inter-disciplinary mathematics reflecting the applications in the areas of sciences and engineering RAMSA-2016 was intended to expose the researchers to emerging trends and areas of research that has significant mathematical, scientific and computational importance.

The three days conference was inaugurated by Prof S. C. Saxena, Hon'ble Vice Chancellor, Jaypee Institute of Information Technology, Noida by lightening the lamp and releasing the souvenir of the Conference RAMSA 2016. The conference was a grand success with fourteen sessions in all out of which five sessions were devoted to Oral Presentations across diverse set of themes. There were three keynote addresses and ten plenary talks in various emerging areas of interdisciplinary nature. The following eminent speakers delivered lectures during the conference on the topics of their areas of expertise: Prof. Miloslav Znojil from Nuclear Physics Institute, Czech Republic, Prof. F. M. Fernández from National University of La Plata, Argentina, Prof. J. Prakash from University of Botswana, Botswana, Prof. B. S. Panda from Indian Institute of Technology, Delhi, Dr. V. K. Sharma from ISSA, DRDO, New Delhi, Prof. G. P. Kapoor from Indian Institute of Technology, Kanpur, Prof. M. C. Joshi from Kumaun University Nainital, Prof. A.K. Nandakumaran from Indian Institute of Science, Bangalore, Prof. Karmeshu from Jawaharlal Nehru University New Delhi, Dr. Dhananjoy Dey from SAG, DRDO, New Delhi, Prof. B. P. Mandal from Banaras Hindu University, Varanasi, Prof. Kusum Deep from Indian Institute of Technology, Roorkee, Prof. G. Rangarajan from Indian Institute of Science, Bangalore.

The conference was partially supported by Science and Engineering Research Board (SERB), a statutory body under Department of Science & Technology, Government of India, New Delhi. The themes of oral paper presentations were divided into following five tracks: Analysis and Approximation Theory: Wave Propagation and Mathematical Modelling; Continuum Mechanics and Numerical Analysis; Fuzzy, Image Processing and Operational Research; Algebra, Calculus, Cryptography and Others. All the technical sessions were rich in content including the talks of eminent speakers from diverse areas of expertise and every session was productive enough to stimulate the academic interactions.

About eighty-two papers were accepted for oral presentations and forty seven research papers were presented in the conference in all the tracks. Finally, twenty papers after rigorous peer review have been accepted for publication in American Institute of (AIP) Proceedings which is indexed in Scopus and other reputed Indexing agencies. All the papers of the (AIP) Proceedings are available online at http://aip.scitation.org/toc/acp/1802/1

The conference was closed with the valedictory function presided by Prof. H. O. Gupta, Director, JIIT-128. The report of the three days conference was presented by the Organizing Secretary. The conference was ended by proposing a vote of thanks to one and all.

Brief Report: "2nd International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2017)"

The Department of Mathematics, Jaypee Institute of Information Technology, Noida (UP), has successfully organized its 2nd International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2017) during December 12-14, 2017. The theme of the conference included almost all active research areas in pure, applied and inter-disciplinary mathematics reflecting the applications in the areas of sciences and engineering.

The three days conference was started as per schedule at 9:00 a.m. on December 12, 2017, with the registration of participants followed by the inaugural function. The conference was inaugurated with prayer and lightening of lamp before the Goddess Saraswati. Dr. Pato Kumari, the Organizing Secretary of RAMSA-2017, welcomed all the guests and participants. The details about the conference and its program were presented by Prof. B. P. Chamola, Convenor, RAMSA-2017. Prof. Alka Tripathi, Head of the Department of Mathematics, presented a brief history of the Department since its inception and its multifaceted activities before the delegates. The function was graced by the Chief Guest Prof. S. C. Saxena, Vice Chancellor, Jaypee Institute of Information Technology, Noida. In his inaugural address, he explained the significance of mathematics and its application in different disciplines of knowledge in a very lucid and simple manner. After the inaugural function, the technical sessions of the day started with the first keynote address by Prof. Jeffrey Hunter, Aukland University of Technology, New Zealand on the topic "Mean First Passage Times in Markov Chains – How best to compute?". In his talk, he discussed various recently developed perturbation techniques for finding key properties of Markov chains including finding the mean first passage times. Prof. M. T. Nair from Indian Institute of Technology, Madras delivered his talk on "A Discrete Regularization Method for Fredholm Integral Equations of the First Kind". In this talk he discussed about the

stable approximations for the solution or least square solution of Fredholm Integral Equations of the First Kind. The next speaker Prof. S.G. Dani from UM-DAE Centre for Excellence Basic Sciences (CBS), University of Mumbai, spoke on equations, inequalities, and their solutions in integers. The next lecture was delivered by Prof. Florin Diacu, Yale-NUS College, National University of Singapore and University of Victoria, Canada on "The N- body Problem in Spaces of Constant Curvature". The last talk of this session was delivered by Dr. Debasis Dutta, Systems Analysis & Modelling Centre, Defence R & D Organisation, New Delhi, India which was focused on some of the applications of mathematical techniques in military decision making. Thereafter, the paper presentation session started around 4:45 PM which continued up to 06:30 PM in parallel tracks.

The program of second day, on December 13, 2017, started with the Keynote address of Prof. G Rangarajan from Indian Institute of Science, Bangalore. The title of his talk was "Sparse Vector Autoregressive and Network Representations of High Dimensional Time Series Data". The next talk of this session was on "Challenges in Stochastic Modeling for Telecommunication Systems" by Prof. S. Dharmaraja from Indian Institute of Technology, Delhi. In this lecture, the recent work on closed form solutions to the two important Quality of Service (QoS) measures used in 2G and 3G generation cellular networks were discussed. The next speaker Prof. Neela Nataraj, IIT Bombay spoke on finite element methods for the linear and non-linear models for plate bending problems. Prof. V. Ravichandran, Delhi University, Delhi presented a brief introduction to the geometric function theory beginning with Bieberbach conjecture and discussed several recent developments in this area. The speaker of the third session of the day was Prof. B R Kopparty, Indiana University Northwest, Gary, USA, who presented a comprehensive development of generalized inverses of matrices and their related results. The paper presentation session of the day started as per schedule at 3:35 P.M. and continued up to 5:30 P.M. in parallel tracks.

The Keynote address of the third day on December 14, 2017, was delivered by Prof. A K Srivastava, Banaras Hindu University, Varanasi, on the topic "A Sierpinski Object Miscellany" and presented his contributions in the frame of category theoretic approach. Prof. Vijay Gupta, NSIT Delhi, spoke on "Certain Convergence Estimates for Linear Positive Operators" and discussed various applications of quantum calculus on convergence behaviour of linear positive operators. The last talk was on "Optimization and Max-Plus Algebra" delivered by Prof. S K Neogy, Indian Statistical Institute, Delhi in which he described various optimization problems using methods based on max-plus algebra, which has maximization and addition as its basic arithmetic operations. Finally, there was the session of the last track of paper presentations. Overall, the conference was a grand success with sixteen sessions in all, out of which six sessions were devoted to Oral Presentations across diverse set of themes. There were thirteen keynote/plenary talks in

various emerging areas of interdisciplinary nature. The conference was partially supported by Science and Engineering Research Board (SERB), a statutory body under Department of Science & Technology and DRDO under Ministry of Defence, Government of India, New Delhi. About hundred papers were accepted for oral presentations and seventy research papers were presented across five different tracks in six sessions. The delegates participating in this conference were from IITs, NITs, Central and State Universities and Research and Development Institutes of India and reputed universities of USA, Canada, New Zealand, Singapore, Germany, South Africa, and Malaysia. The Proceedings of the conference were published online by American Institute of Physics (AIP), USA in which thirty-nine papers after rigorous peer review have been included (http://aip.scitation.org/toc/acp/1897/1)

The conference closed with the Valedictory function at 1:20 P.M. on December 14, 2017. Prof. Hari Om Gupta, Director, Jaypee Institute of Information Technology, Noida was the Chief Guest of the Valedictory function. Prof. B. P. Chamola presented an overview of the conference and proposed the vote of thanks to one and all.

Brief Report: "3rd International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2019)"

The 3rd International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2019) was successfully organized by the Department of Mathematics, Jaypee Institute of Information Technology, Noida (UP) during January 17-19, 2019. Almost all active and emerging research areas in pure, applied, and inter-disciplinary mathematics were included in theme of the conference. The conference was successful in meeting its prime objective of bringing together learned mathematicians, scientists, engineers and young researchers working in the different areas of mathematical sciences and its applications at a common platform for exchange of ideas regarding the research findings and new advances in their respective areas.

RAMSA-2019 was started on January 17, 2019, strictly according to the program schedule with prayer and lightening of lamp before the Goddess Saraswati. Dr. Pato Kumari, Organizing Secretary of the conference, welcomed all the delegates. The details about the conference and its program were presented by the Convenor Prof. B. P. Chamola. Prof. Alka Tripathi, Head of the Department, introduced the Department and its multifaceted activities before the audience. The inaugural function was graced by the Chief Guest Prof. S. C. Saxena, Vice Chancellor, Jaypee Institute of Information Technology, Noida. In his inaugural address, he explained the importance of organizing the academic activities like this for inter disciplinary interaction and collaborative research work. He said that all the

delegates in general and young budding researchers in particular, should fully utilize the opportunity of sound interaction with the renowned experts in their respective areas available at this platform. Prof. Hariom Gupta, Director, JIIT Sector 128 campus emphasized the importance of Mathematics in the advancement of diverse domains of knowledge. After the inaugural function, the technical sessions of the day started with the first keynote address by Prof. Mališa Žižović, University of Kragujevac, Serbia on the topic "calculation of weighted coefficients based on level construction." He discussed various recently developed multi- criteria decisions making models and presented a novel methodology for determining weighted coefficients in multi-criteria decision-making analysis.

Prof. Debasis Kundu, Indian Institute of Technology, Kanpur delivered his talk on "geometric skew normal distribution: a journey beyond normality." He introduced a three-parameter skewed distribution using geometric sum of independent identically distributed normal random variables of which normal distribution is a special case and proposed an EM algorithm for computation of the maximum likelihood estimators of the unknown parameters. Next, Prof. Riddhi Shah from Jawaharlal Nehru University, Delhi, spoke on the topic "distality and expansivity." Prof. Amitabha Tripathi of Indian Institute of Technology, New Delhi spoke on the topic "on changes in the Frobenius and Sylvester number from 2-sets to 3-sets". The last invited talk of the day was by Prof. Atma Sahu of Coppin State University, USA. His title of the talk was "RBNN machine learning simulation for vibration frequencies of the rotating blade and leveraging US-India meta-heuristics of global networking." He discussed about the use of Regression Based Neural Network (RBNN) machine learning simulation to study the problem of determining the natural frequencies of the rotor blade for micro unmanned helicopter. The paper presentation session of the day started as per schedule at 4:20 P.M. and continued up to 6:15 P.M. in parallel tracks.

The first speaker of the second day (January 18, 2019) was Prof. Ankit Agrawal from Northwestern University, Evanston, USA. The title of his talk was "high performance data mining: an essential paradigm for applied mathematics & interdisciplinary big data analytics". He highlighted some of the exciting research results both in high performance data mining and the application of data-driven analytics in various scientific and engineering domains such as materials science, healthcare, and social media. The next speaker Prof. Mahesh C Joshi of Kumaun University, Nainital discussed about "fixed point theorems and metric completeness." Prof. U.C. Gairola, H.N.B. Garhwal University, Srinagar delivered his talk on "some fixed-point theorem on finite product of metric spaces." Prof. Indranil Biswas, a Shanti Swarup Bhatnagar awardee from Tata Institute of Fundamental Research, Mumbai, talked on "holomorphic Cartan geometry." Thereafter, the paper presentation session started which continued up to 5:00 PM in parallel tracks.

The program of third day, on January 19, 2019, started with the talk of Prof. S. K. Tomar of Panjab University, Chandigarh on “waves in elastic material with voids subjected to electro- magnetic interactions.” Prof C S Lalitha of University of Delhi, Delhi, delivered next talk on “convex optimization and its application”. She presented an overview of the basic concepts and application of convex problem in medical imaging. The last talk of this session was delivered by Dr. Girish Mishra of Scientific Analysis Group (SAG), Defence R & D Organisation, New Delhi on “mathematical foundations for cryptology”. Finally, there was the session of the last track of paper presentations. There were sixteen sessions in all, out of which six sessions were devoted to Oral Presentations across diverse set of themes. Twelve experts renowned in their areas of expertise delivered talks in various emerging areas of interdisciplinary nature. About hundred papers were accepted for oral presentations out of which sixty-eight were presented in six sessions. The conference has participation from IITs, NITs, Central and State Universities and Research and Development Institutes of India and reputed universities of USA, UK, Canada, Poland, Eritrea, Serbia, Iraq, Nigeria, Switzerland, and South Africa. The Proceedings of the conference were published online by American Institute of Physics (AIP), USA in which thirty-nine peer reviewed papers have been included (https://aip.scitation.org/toc/apc/2061/1)

The conference was partially supported by Science and Engineering Research Board (SERB), a statutory body under Department of Science & Technology and Defence Research and Development Organization (DRDO) under Ministry of Defence, Government of India, New Delhi. The conference was concluded with the Valedictory function on January 19, 2019. Prof. D. K Rai, Dean (A&R), JIIT, Noida was the Chief Guest of the Valedictory function. Prof B. P. Chamola presented an overview of the conference and proposed the vote of thanks.

Brief Report: “4th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2020)”

The 4th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2020) was successfully organized by the Department of Mathematics, Jaypee Institute of Information Technology, Noida (UP) during January 09-11, 2020. Almost all active and emerging research areas in pure, applied, and inter-disciplinary mathematics were included in theme of the conference. The conference was successful in meeting its prime objective of bringing together learned mathematicians, scientists, engineers, and young researchers working in the different areas of mathematical sciences and its applications at a common platform for exchange of ideas regarding the research findings and new advances in their respective areas. RAMSA-2020 was started

on January 09, 2020, strictly according to the program schedule with prayer and lightening of lamp before the Goddess Saraswati. Dr. Pato Kumari, Organizing Secretary of the conference, welcomed all the delegates. The details about the conference and its program were presented by the Convenor Prof. B. P. Chamola. Prof. Alka Tripathi, Head of the Department, introduced the Department and its multifaceted activities before the audience. The inaugural function was graced by the Chief Guest Prof. S. C. Saxena, Vice Chancellor, Jaypee Institute of Information Technology, Noida. In his inaugural address, he explained the importance of organizing the academic activities like this for inter disciplinary interaction and collaborative research work. He said that all the delegates in general and young budding researchers in particular, should fully utilize the opportunity of sound interaction with the renowned experts in their respective areas available at this platform. After the inaugural function, the technical sessions of the day started with the first keynote address by Prof. Jichun Li, University of Nevada Las Vegas, USA on the topic "Mathematical Analysis and Finite Element Simulation of Invisibility Cloaks". He discussed various recently developed time-domain cloaking models and presented numerical simulations of invisibility cloaks and other interesting simulations such as optical black holes. Prof. Satya Deo, Harish-Chandra Research Institute, Allahabad delivered his talk on "The Dimension Problem of Multivariate Splines." He explained the concept of spline on a given region in a d-dimensional Euclidean space, which are considered to be a vector space, and how to find its exact dimension. He also elaborated the difficulties arising to find the dimension of these vector spaces. Next, Prof. Melusi Khumalo from University of South Africa, SA spoke on the topic "Numerical Methods for Cordial Volterra Integral Equation with Vanishing Delays." He discussed some numerical approaches to solving Cordial Volterra integral equations (CVIEs) with vanishing delays. The last invited talk of the day was by Prof. Khalil Ahmad of Al- Falah University, Faridabad. His title of the talk was "Applications of Wavelets in Signal and Image Processing". The paper presentation session of the day started as per schedule at 03:00 P.M. and continued up to 6:15 P.M. in parallel tracks.

The first speaker of the second day (January 10, 2020) was Prof. G. D. Veerappa Gowda from TIFR Centre for Applicable Mathematics, Bangalore. The title of his talk was "Applications of Hamilton-Jacobi Equations in Shape from Shading." In his talk, he gave emphasis upon both theoretical and numerical perspectives for the first order non-linear partial differential equations especially focussing on the application in the shape from shading i.e., to recover the shape of 3-dimensional object from 2-dimensional informations. The next speaker Prof. Pankaj Jain of South Asian University, Delhi, discussed about "Integral Transforms of Fourier Type and Their Generalizations." He discussed about fractional Fourier transform and more general linear canonical transform. Prof. Renu Chugh,M. D. University Rohtak delivered her talk on "Developments in

Metric Fixed Point Theory." Prof. Maithili Sharan, a Shanti Swarup Bhatnagar awardee from Indian Institute of Technology, Delhi talked on "Mathematical Modelling." The last talk of the day was delivered by Prof. Danila Prikazchikov, Keele University, UK. He spoke on Long-wave propagation in multi-layered and multi-component strongly inhomogeneous structures. Thereafter, the paper presentation session started which continued up to 06:30 PM in parallel tracks.

The program of third day, on January 11, 2020, started with the talk of Prof. Vir. V. Poha of Syracuse University, New York, USA on "Big Data through Wearable Devices– Challenges and Opportunities." He presented properties of sensor streams from typing, swiping, hand movement, gait, thinking obtained from wearable devices, such as smart watch, EEG, and smart phones. He also discussed feature engineering from raw data and various machine learning algorithms that we used to build predictive systems from this data. Prof. R. C. Mittal of JIIT Noida delivered next talk on "Efficient Solutions of Sparse Systems of Linear Equations". Finally, there was the session of the last track of paper presentations. There were fifteen sessions in all, out of which five sessions were devoted to Oral Presentations across diverse set of themes. Eleven experts renowned in their areas of expertise delivered talks in various emerging areas of interdisciplinary nature. About hundred papers were accepted for oral presentations out of which sixty-three were presented in five sessions. The conference has participation from IITs, NITs, Central and State Universities and Research and Development Institutes of India and reputed universities of USA, UK, Poland, Serbia, Nigeria, Malaysia, and South Africa. The Proceedings of the conference were published online by American Institute of Physics (AIP), USA in which thirty-nine peer reviewed papers have been included (https://aip.scitation.org/toc/apc/2214/1). The conference was partially supported by Science and Engineering Research Board (SERB), a statutory body under Department of Science & Technology, Government of India, New Delhi.

The conference was concluded with the Valedictory function on January 11, 2020. Prof. Hari Om Gupta, Director, Sec-128, JIIT, Noida was the Chief Guest of the Valedictory function. Prof B. P. Chamola presented an overview of the conference and proposed the vote of thanks.

Brief Report: "5th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2021)"

The 5th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2021) was successfully organized by the Department of Mathematics, Jaypee Institute of Information Technology, Noida (UP) during December 02-04, 2021 in Online mode. The aim of this conference was to bring together learned mathematicians, scientists, engineers, researchers from industry and research scholars working in the different areas of mathematics at a common platform. This conference facilitated the exchange of ideas regarding the research findings and new advances in mathematics in the wide area of mathematics, sciences and engineering and provided a platform to discuss the practical challenges encountered in the different domains of applications and the solutions adopted thereto. Moreover, it has generated an excellent opportunity to enhance collaboration among researchers not only from the various parts of the country but also with those from abroad. The scientific program of the conference consisted of Keynote/plenary/invited lectures and parallel sessions for contributed presentations. RAMSA-2021 was initiated on December 02, 2021 strictly according to the program schedule with prayer and lightening of lamp before the Goddess Saraswati. Dr. Pato Kumari, Organizing Secretary of the conference, warmly welcomed all the delegates. Prof. B. P. Chamola, Convenor of the conference presented extensive details about the conference and then describes conference program. Then after, Prof. Alka Tripathi, Head, Department of Mathematics, introduced the Department and explain about the multifarious activities, performed by the department in diverse area of teaching and research, before the audience. The inaugural function was graced by the Chief Guest Prof. Yog Raj Sood, Vice Chancellor, Jaypee Institute of Information Technology, Noida. Prof. Yog Raj Sood has elaborated the potential importance of organizing the academic activities like this for inter disciplinary interaction and collaborative research work. He said that all the delegates and participants must fully utilize the opportunity of deep interaction with the renowned experts in their respective areas during this conference. Prof. Hariom Gupta, Director, JIIT Sector 128 campus emphasized the importance of Mathematics in the advancement of diverse domains of knowledge. After the successful completion of inaugural function, the technical sessions of the day started with the first keynote address by Prof. Jichun Li, University of Nevada Las Vegas, USA on the topic "Finite Element Analysis and Simulation of Surface Wave Propagation in Graphen". He discussed various recently developed novel techniques for finite element analysis and simulation of surface wave propagation. Prof. Kalyan Chakraborty, Kerala School of Mathematics, Kerala, India delivered his talk on "Sturm-type Bound for Square-Free Coefficients of Hilbert Modular Forms." He elaborated an analysis for finding bound for square-free coefficients; these bounds are of Sturm-type. Next, Prof. M. Thamban Nair, Indian Institute of Technology

Madras, Chennai, India, spoke on the topic "On Regularization for an Inverse Problem in a Parabolic PDE". The paper presentation session of the day started as per schedule at 3:00 P.M. and continued up to 5:30 P.M. in parallel tracks named as Track A: Calculus, Algebra, Analysis & Approximations and Track B: Mathematical Modelling & Simulation.

The first speaker of the second day (December 03, 2021) was Prof. Mohammad Sajid from Qassim University, Saudi Arabia. The title of his talk was "Fractals, Chaos and Dynamical Systems". He highlighted some of the exciting research results about fractals and dynamical systems with their potential applications. The next speaker Prof. C. S. Lalitha, Delhi University, Delhi, India discussed about "Variational Inequalities and Some Formulations". Prof. Kapil Kumar Sharma, South Asian University, Delhi, India delivered his talk on "Singularly Perturbed Problems: Issues and Challenges". Then after, Prof. Janusz Matkowski, University of Zielona Góra, Institute of Mathematics, Poland, delivered a keynote lecture on "Remarks on a Fixed-point Theorem for Nonexpansive Mappings and its Applications". Prof. Maithili Sharan, Indian Institute of Technology, Delhi, India delivered a expert talk entitled as "Motions and Scales in Atmospheric flows". A Plenary talk entitled as "Dynamics of Actions of Automorphisms of Locally Compact Groups G on $\boldsymbol{SubG}$" was delivered by Prof. Riddhi Shah, Jawaharlal Nehru University Delhi, India. Furthermore, the paper presentation session started, which continued up to 5:30 PM in parallel tracks named as Track C: Continuum Mechanics, Differential Equation & Numerical Analysis And Track D: Soft Computing, Fuzzy, Image Processing & Operational Research.

The program of third day, on December 03, 2021 started with the Keynote lecture by Prof. R. C. Mittal, JIIT Noida, India on "Generation of Some Fractals". Dr. Prasanna R. Mishra, Scientific Analysis Group (SAG), DRDO, Delhi, India delivered Plenary talk on "How Quantum Computing Affects Cryptology?". Prof. Mohd. Mursaleen, Aligarh Muslim University, Aligarh, India delivered next talk on "Compactness of matrix operators between sequence spaces and applications". Finally, there was the session of the last track of paper presentations. There were nineteen sessions in all, out of which six sessions were devoted to Oral Presentations across diverse set of themes. Thirteen experts renowned in their areas of expertise delivered talks in various emerging areas of interdisciplinary nature. About hundred papers were accepted for oral presentations out of which forty two were presented in six sessions. The conference has participation from IITs, NITs, Central and State Universities and R&D Institutes of India and reputed international universities. The Proceedings of the conference were published online by Nova Science Publisher, USA. The conference was concluded with the Valedictory function on December 04, 2021. Prof. D. K Rai, Dean (A&R), JIIT, Noida was the Chief Guest of the Valedictory function. Prof B. P. Chamola presented precise glimpses of the conference and proposed the vote of thanks.

Brief Report: "6th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2022)"

The 6th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2022) was successfully organized by the Department of Mathematics, Jaypee Institute of Information Technology, Noida (UP) during December 08-10, 2022 in Online mode. The aim of this conference was to bring together learned mathematicians, scientists, engineers, researchers from industry and research scholars working in the different areas of mathematics at a common platform. The Conference provides an excellent opportunity to researchers, practitioners and educators to present and discuss the recent innovations in mathematics for potential implementation in sciences and engineering. It focuses on strengthening the existing results along with identifying the practical challenges encountered with respect to various solutions adopted in the fields of Mathematics and its Applications. Moreover, it provided an opportunity to enhance collaboration among researchers not only from the various parts of the country but also with those from abroad. The main emphasis was on the vibrant implicational aspects of applied mathematics for cultivating contemporary and advanced findings in multidimensional sphere of engineering and sciences. The scientific program of the conference consisted of Keynote/plenary/invited lectures and parallel sessions for contributed presentations. RAMSA-2022 was initiated on December 08, 2022 strictly according to the program schedule with prayer and lightening of lamp before the Goddess Saraswati. Dr. Yogesh Gupta, Convenor of the conference, warmly welcomed all the delegates. Dr. Lakhveer Kaur, Convenor of the conference presented extensive details about the conference and then describes conference program. Then after, Prof. Alka Tripathi, Head, Department of Mathematics, introduced the Department and explain about the multifarious activities, performed by the department in diverse area of teaching and research, before the audience. The three days conference was inaugurated by Prof S. C. Saxena, Hon'ble Pro Chancellor, Jaypee Institute of Information Technology, Noida by lightening the lamp and releasing the souvenir of the Conference RAMSA 2022.

The conference was a grand success with seventeen sessions in all, out of which five sessions were devoted to Oral Presentations across diverse set of themes. There were three keynote addresses and twelve plenary talks in various emerging areas of interdisciplinary nature. The following eminent speakers delivered lectures during the conference on the topics of their areas of expertise: Prof. Apala Majumdar,from University of Strathclyde, Glasgow, UK, Prof. Om Prakash from IIT Patna, Prof. Yogesh Suman, Senior Principal Scientist, Nodal Officer, Director Secretariat and Research Cell, Head, CSIR-NIScPR, New Delhi, Prof. M. Mursaleen from Aligarh Muslim University, Aligarh and China Medical University, Taiwan, Prof. M. Lakshmanan, F.N.A., FTWAS, Professor of

Eminence & DST-SERB National Science Chair, Department of Nonlinear Dynamics, Bharathidasan University, Tiruchirapalli, India (Shanti Swarup Bhatnagar Awardee 1989), Prof. S. R. Chaudhari, Director, School of Mathematical Sciences, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, India, Prof. Dumitru Baleanu from Institute of Space Sciences, Magurele-Bucharest, Romania, Prof. Kusum Deep, IIT Roorkee and Visiting Professor, Liverpool Hope University, UK, Prof. B. V. Rathish Kumar from IIT Kanpur, Prof. Palle Jorgensen, Department of Mathematics, University of Iowa, USA, Prof. Anish Ghosh, TIFR, Mumbai (Shanti Swarup Bhatnagar Prize, 2021), Prof. R. K. Mohanty, Professor & Acting President, South Asian University, New Delhi, India. About one hundred eleven papers were accepted for oral presentations out of which fifty six were presented in five sessions. The conference has participation from IITs, NITs, Central and State Universities and R&D Institutes of India and reputed international universities. The conference was partially supported by Science and Engineering Research Board (SERB), a statutory body under Department of Science & Technology, Government of India, New Delhi.

The conference was concluded with the Valedictory function on December 10, 2022. Prof. D. K Rai, Dean (A&R), JIIT, Noida was the Chief Guest of the Valedictory function. The conference was ended by proposing a vote of thanks by Dr. Yogesh Gupta, Convener to one and all.

Jaypee Institute of Information Technology

(Declared Deemed to be University u/s 3 of the UGC Act)

MANOJ GAUR
Chancellor

February 01, 2024

MESSAGE

I am happy to note that the **Seventh edition of the International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2024)"** is going to take place at the **Department of Mathematics, Jaypee Institute of Information Technology (JIIT), Noida (U.P.)** during February 29 to March 02, 2024.

Mathematics is the foundation of all domains of knowledge connected to science, engineering, and technology. This conference will provide an opportunity to attendees to present their research work in different areas of mathematical science and its applications. I believe that the deliberations at RAMSA-2024 will help all the attendees to enrich further their research, development, and innovation activities.

I appreciate the efforts put in by the organizers to make this event a great success and wish the delegates a valuable and enjoyable experience at JIIT, Noida during the conference.

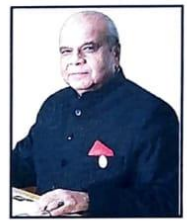
With best wishes,

(Manoj Gaur)

Jaypee Institute of Information Technology
(Declared Deemed to be University u/s 3 of the UGC Act)

Prof. S C Saxena
Pro-Chancellor

February 01, 2024



MESSAGE

I am delighted to know that the 7th International Conference on **"Recent Advances in Mathematical Sciences and its Applications (RAMSA-2024)"** is taking place at the **Department of Mathematics, Jaypee Institute of Information Technology, Noida (U.P.)** during February 29 to March 02, 2024.

The conference will provide all participants with a chance for rich professional learning and insight in its theme areas on a single platform. I have no doubt that the fruitful interactions and scholarly exchanges, that transpire throughout "RAMSA-2024", will result in increasing their knowledge bank to work in different areas of mathematics and also in its allied domains.

I appreciate the efforts put in by the organizers of this conference and wish a grand success to this event.

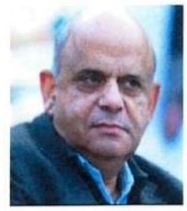
With best wishes,

(S. C. Saxena)

Jaypee Institute of Information Technology
(Declared Deemed to be University u/s 3 of the UGC Act)

Prof. (Dr.) Bodh Raj Mehta
Vice-Chancellor

February 05, 2024



Message

I am happy to note you that the 7th International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2024)" is being organized from February 29 to March 02, 2024, by the Department of Mathematics at the Jaypee Institute of Information Technology, Noida (UP).

I am confident that the conference will provide an opportunity for JIIT faculty and students to interact with mathematicians, scientists, engineers, and research scholars from all parts of India and abroad. This event will inspire young scientists to work in the emerging areas of mathematics and its applications besides providing them a platform for possible collaborative works in the common areas of interests.

All the best for the outstanding success of the event.

With best wishes,

(Bodh Raj Mehta)

Jaypee Institute of Information Technology
(Declared Deemed to be University u/s of the UGC Act)

Message from Organizers

We extend a warm welcome to each of you to the '7th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2024),' organized by the Department of Mathematics, Jaypee Institute of Information Technology, Noida. Taking place from February 29 to March 2, 2024, we are honored to serve as organizers of this intellectually stimulating event, which includes participation from across India and abroad. We stand united in our commitment to providing a platform for the exchange of cutting-edge research and fostering collaboration in the realm of mathematical sciences.

The abstracts featured in this book epitomize the spirit of inquiry and innovation that defines our conference. The diverse perspectives represented in these abstracts are a testament to the vibrancy of the mathematical community.

To our esteemed contributors, we express our sincere gratitude for your invaluable contributions. Your dedication to pushing the boundaries of mathematical knowledge is what makes this conference a hub of inspiration and intellectual growth. A heartfelt thank you goes out to our collaborators and the tireless organizing committee for their unwavering support in orchestrating this event. Their commitment has been instrumental in creating an environment conducive to exploration and collaboration.

Similarly, as with our previous six conferences in the RAMSA series, which were greatly successful with your full participation and support, we embark on these days of shared learning and discourse. Let us embrace the opportunity to delve into the latest developments in the mathematical sciences, forge new connections, and collectively contribute to the advancement of our field. The 7th International Conference on Recent Advances in Mathematical Sciences and its Applications is not just a conference; it is a convergence of minds committed to the pursuit of mathematical excellence.

We express our sincere gratitude to Honorable Shri Jaiprakash Gaur Ji, Founder Chairman of Jaypee Group; Shri Manoj Gaur Ji, Chancellor of JIIT Noida; Prof. S. C. Saxena, Pro Chancellor of JIIT Noida; and Prof. B. R. Mehta, Vice Chancellor of JIIT Noida, for their unwavering support, guidance, and motivation. Their continuous commitment has played a pivotal role in ensuring the smooth execution and resounding success of the conference for the seventh consecutive time.

We extend our best wishes for an engaging and fruitful conference. May the exchange of ideas during these days lead to discoveries that shape the future of the mathematical sciences.

Warm regards,

Prof. Alka Tripathi
Head, Dept. of Mathematics

Dr. Pankaj Srivastava
Convener

Dr. Dinesh Bisht
Convener

Organizing Committee

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Prof. A. K. Srivastava, Banaras Hindu University, India

Keynote Speakers

Prof. Enrique Zuazua (Eibar, Basque Country–Spain, https://dcn.nat.fau.eu/enrique-zuazua/) holds, since September 2019, the Chair for Dynamics, Control, Machine Learning and Numerics - Alexander von Humboldt Professorship, at the Department of Mathematics of the Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) in Germany and part-time appointments at Universidad Autónoma de Madrid (UAM) and the Fundación Deusto, Bilbao. He is also a member of Jakiunde, the Basque Academy of Sciences, Letters and Humanities and of the Academia of Europaea, and cooperates with the artificial intelligence company Sherpa AI in Bilbao.

He holds a degree in Mathematics (1984) from the University of the Basque Country, and a dual Ph.D. degree from the same university (1987) and the Université Pierre et Marie Curie, Paris (1988). In 1990 he became Professor of Applied Mathematics at the Universidad Complutense de Madrid, to later move to UAM in 2001.

He has been awarded the Euskadi (Basque Country) Prize for Science and Technology 2006 and the National Julio Rey Pastor Prize 2007 in Mathematics and Information and Communication Technology and the Advanced Grants of the European research Council (ERC) NUMERIWAVES in 2010, DYCON in 2016 and CodeFeL in 2022. In 2022 he was awarded the W.T. and Idalia Reid Prize of SIAM. He was invited section speaker in “Control and Optimization” in ICM2006, madrid.

With over 300 articles published, his work had an important impact (h-index = 49). He has supervised 30 PhD students and a broad network of master students, post-doctoral researchers and research and management technicians. His fields of expertise in the broad area of Applied Mathematics cover topics related with Partial Differential Equations, Systems Control and Numerical Analysis and Machine Learning.

He is the co-editor-in-chief of the Journals ”Mathematical Control and Related Fields” and “Advances in Continuous and Discrete Models” and member of the editorial committee of other Journals and of scientific committees of various centers and agencies.

He was the first Manager for the area of Mathematics of the Spanish National Research Plan in 1999-2002, the Founding Scientific Director of the Basque Center for Applied Mathematics (BCAM) in 2008-2012 and in 2016 he launched the Chair of Computational Mathematics at the Deusto Foundation, both in Bilbao. Since 2021 he is the speakers of the FAU Research Center for Mathematics of Data (MoD).

He also develops an intense dissemination agenda, gathered at https://cmc.deusto.eus/enzuazua/

Professor Tanmoy Som, an esteemed academician and a stalwart in the field of mathematical sciences, has left an indelible mark on the academic landscape through his prolific career spanning over three decades. Currently serving as a Professor in the Department of Mathematical Sciences at the Indian Institute of Technology (BHU), he assumed the esteemed position of Head of the department on November 4, 2018, a testament to his leadership and academic acumen.

Throughout his illustrious career, Prof. Som has demonstrated an unwavering commitment to advancing knowledge in various domains of mathematics, particularly in Fixed Point Theory, Fuzzy Set Theory, Soft Computing, and Mathematical Modeling. His scholarly contributions are reflected in his impressive publication record, comprising over 150 research papers in reputable national and international journals, as well as contributions to esteemed proceedings of international conferences. Additionally, he has authored book chapters and edited two proceedings, further cementing his status as a thought leader in his field.

Prof. Som's impact extends beyond his own research endeavors, as evidenced by his role in mentoring and guiding numerous scholars. Under his supervision, sixteen scholars have been awarded Ph.D. degrees, while another nine are currently pursuing their research under his tutelage. Moreover, he has overseen the completion of sixteen Master's theses and seven M. Phil. dissertations, nurturing the next generation of mathematical scholars.

A sought-after speaker and expert in his field, Prof. Som has delivered approximately sixty invited talks and keynote speeches at national and international conferences, seminars, and workshops. His engagements have taken him across the globe, including notable visits to institutions such as Texas A&M University-Kingsville, USA, and the University of California, Berkeley, USA. Additionally, he has played a pivotal role in organizing several national and international conferences and workshops, showcasing his leadership and organizational skills.

In recognition of his expertise, Prof. Som has served as a reviewer for esteemed national and international journals, including IEEE Transactions on Fuzzy Systems, while also assuming the role of Handling Editor for the International Journal of Fuzzy Computation and Modeling. Furthermore, he has contributed significantly to the academic community as the Coordinator of Conference and Continuing Education Program (CEP) initiatives at his institute and as a member of various academic committees.

Prof. Som's academic journey commenced with a strong educational foundation, having obtained his B.Sc. and M.Sc. degrees from Banaras Hindu University in 1978 and 1980, respectively. He pursued his Ph.D. from the same institution, where his research prowess was acknowledged with prestigious accolades such as the Senior Research Fellowship from

the Council of Scientific and Industrial Research, Government of India, and the National Merit Scholarship.

In summary, Prof. Tanmoy Som's multifaceted contributions to the field of mathematical sciences encompass groundbreaking research, mentorship, and academic leadership. His unwavering dedication to advancing knowledge and nurturing talent underscores his status as a luminary in the academic community, inspiring generations of scholars to pursue excellence in mathematics and beyond.

Professor Debasis Kundu received his B.Stat and M.Stat from the Indian Statistical Institute in 1982 and 1984, respectively, M.A. in Mathematics from the University of Pittsburgh in 1985 and Ph.D. from the Pennsylvania State University in 1989 under the guidance of Professor C.R. Rao. After finishing his Ph.D., he joined The University of Texas at Dallas as an Assistant Professor before joining Indian Institute of Technology Kanpur in 1990. He served as the Head of the Department of Mathematics and Statistics, IIT Kanpur from 2011 to 2014 and the Dean of Faculty Affairs at IIT Kanpur from 2019 to 2022. Professor Kundu is holding an Endowed Chair Professor post of the Institute since 2008.

Professor Kundu works on different areas of Statistics. His major research interests are on Statistical Signal Processing, Lifetime Data Analysis and Statistical Computing. He has published more than 375 research papers in different well reputed Statistical and Signal Processing journals like IEEE Transaction on Signal Processing; Signal Processing; Circuits, Systems and Signal Processing; Technometrics; Annals of the Institute of Statistical Mathematics; Statistica Sinica; Scandinavian Journal of Statistics; Journal of Multivariate Analysis; Computational Statistics and Data Analysis; Journal of Statistical Planning and Inference; IEEE Transactions on Reliability etc.

His work has been well cited by different researchers. He has more than 19,068 google scholar citations with H index 67. He has co-authored three books on Statistical Signal Processing and lifetime data analysis and co-edited one book on Statistical Computing. He is a Fellow of the National Academy of Sciences, India, and a Fellow of the Indian Society of Probability and Statistics. He has received the Distinguished Teacher's Award from IIT Kanpur, Distinguised Statistician's Award from the Indian Society of Probability and Statistics and Professor P.C. Mahalanobis Distinguished Educator's Award by the Operation Society of India. He is currently the Editor-in-Chief of the Journal of the Indian Society of Probability and Statistics, and in the editorial boards of Sankhya, Ser. B, Indian Journal of Pure and Applied Mathematcs and Journal of Statistical Theory and Practice.

Prof. Sushil Kumar Tomar is a distinguished academician, researcher and educational administrator. He is currently the Vice-Chancellor of JC Bose University of Science and Technology, YMCA, Faridabad (formerly known as YMCA University of Science and Technology). Prof. Tomar, who is also a well known Mathematician, assumed the office of Vice-Chancellor on February 22, 2022 as the seventh Vice-Chancellor of the University.

Prior to joining JC Bose University, Prof. Tomar was Dean of University Instruction at Panjab University, Chandigarh. The career of Prof. Tomar as an academician and researcher spans over 34 years. He brings with him a rich mixture of professional expertise and administrative experience.

He completed his M.Sc., M.Phil and Ph.D degrees from Kurukshetra University, Kurukshetra. He engaged in various activities in Guru Jambheshwar University, Hisar in its formative years during 1995-1999 and established the Department of Applied Mathematics in the University.

Prof. Tomar joined Panjab University in 2000. He was the Chairperson of Centre for Advanced Study in Mathematics, PU, from 2012 to 2015. He remained as Honorary Director of UGC-HRDC at Panjab University, Chandigarh from 2019 to 2022. He has served in many various positions in Panjab University including Dean Instruction, Dean Student Welfare and Dean Research.

Prof. Tomar is known for his research work. He has 128 publications in the journals of international repute and has delivered over 150 lectures in the country and abroad on the different topics of his research. He is a nominated member of the governing body of GJUS&T, Hisar and Central University of Himachal. He was also nominated as a member of the Senate of Panjab University. He is elected Vice- President of All India Association of Vice-Chancellors and Academicians, New Delhi for the period 2020 to 2025.

Prof. Tomar has also been honored with the prestigious IAPS Fellowship Award for his exceptional contributions to the field of Mathematics by the International Academy of Physical Sciences (IAPS), Prayagraj during the 29th International Conference of the International Academy of Physical Sciences (CONIAPS-XXIX) held from July 21st to 23rd, 2023, in Dehradun, Uttarakhand.

In order to sensitize science education among the children and to all other corners of the society, he initiated Chandigarh Vigyan Parishad in the year 2016 which is a part of Vigyan Bharti at national level. He is also an elected fellow of National Academy of Science, India (NASI) and is a recipient of PL Bhatnagar Award lecture of Indian Mathematical Society. He is a widely travelled person and has visited several countries under research collaborations.

Professor Sandip Banerjee is a highly accomplished mathematician and esteemed academician at the Indian Institute of Technology Roorkee (IIT Roorkee), where he has made significant contributions to the field of applied mathematics. With a rich educational background, including a Ph.D. from the University of Calcutta and post-doctoral experience at the University of Helsinki, Banerjee's expertise spans a wide range of mathematical disciplines.

Throughout his career, Banerjee has held various academic positions, including senior lecturer at St. Xavier's College in Kolkata, assistant professor at Birla Institute of Technology and Science (BITS) Pilani, and currently as a professor at IIT Roorkee. His dedication to teaching and research is evident from his involvement in developing courses for national programs such as NPTEL and e-PG Pathshala.

Banerjee's research output is impressive, with over 50 published papers in prestigious international and national journals, including notable contributions to Nature Scientific Reports. Additionally, he has authored several books, including the acclaimed "Mathematical Modeling: Models, Analysis and Applications," published by CRC Press, Taylor and Francis Group.

Recognized for his scholarly achievements, Banerjee has been honored with awards such as the Indo-US Fellowship and a medal from the Indo-US Technology Forum. He has also actively organized and participated in numerous workshops, conferences, and seminars both nationally and internationally, showcasing his leadership and collaborative spirit in advancing mathematical research.

Moreover, Banerjee's involvement in sponsored projects and his supervision of Ph.D. students reflect his commitment to pushing the boundaries of mathematical knowledge and nurturing the next generation of researchers. With a global reach through invited talks and lectures in countries like the UK, USA, Japan, and Russia, Banerjee continues to be a driving force in the field of applied mathematics, inspiring colleagues and students alike with his passion and expertise.

Prof. Shruti Dubey is a distinguished academician and mathematician with a profound expertise in various areas of mathematics, particularly in nonlinear analysis, fractional differential equations, and their applications in ferromagnetic systems and neural networks. Holding a Ph.D. from the Indian Institute of Technology Kanpur, she has established herself as a prominent figure in the field through her extensive research and publications. Currently serving as a Professor in the Department of Mathematics at the Indian Institute of Technology Madras, she has a rich academic background, having completed her Master's and Bachelor's degrees from prestigious institutions in India. With over two decades of teaching and research experience, Dr. Dubey has made significant contributions to the advancement of mathematical knowledge. Her research interests encompass a wide range of topics, including the mathematical study of ferromagnetic systems, fractional calculus, differential equations, and neural networks. She has authored numerous journal publications, book chapters, and conference papers, demonstrating her deep understanding and expertise in these areas.

Throughout her career, Dr. Dubey has actively engaged in academic activities such as delivering invited talks, organizing conferences, and supervising research projects. She has been invited to speak at various national and international conferences, workshops, and seminars, where she has shared her insights and expertise with fellow researchers and students alike. Additionally, she has organized several educational events and served as a mentor to numerous students, guiding them in their academic and research pursuits.

In recognition of her outstanding contributions to the field of mathematics, Dr. Dubey has received several prestigious awards and honors, including being elected as a member of the National Academy of Sciences India (NASI) and receiving the Best Paper Award at the International Conference on Computational Heat and Mass Transfer. She is also an active member of professional societies such as the Indian Mathematical Society (IMS) and has served in various administrative roles within her institution, demonstrating her commitment to academic excellence and service.

Beyond her academic achievements, Dr. Dubey has also been actively involved in institutional governance and community service. She has served on various committees and boards, including as a sports co-advisor, warden of a hostel, and member of academic and administrative committees. Her dedication to serving her institution and the broader academic community is evident in her multifaceted contributions and leadership roles.

In summary, Dr. Shruti Dubey is a highly accomplished mathematician, educator, and academic leader whose impactful research, teaching, and service have made significant contributions to the field of mathematics and the academic community at large. Her passion

for advancing knowledge and fostering excellence in education and research exemplifies her commitment to the pursuit of excellence in all aspects of her professional endeavors.

Dr. Sudipa Chauhan is an Applied Mathematician specializing in mathematical modeling within the domains of epidemics, ecotoxicology, integrated pest management, and health economics. With teaching and industry background spanning 12 years, she excels in dynamical analysis of mathematical models, decision analytic model development, systematic reviews, meta-analysis, and market access in health economics and outcome research. Her contributions include around 55 research papers published in peer-reviewed journals. She has worked on early economic evaluations of multiple projects like BiomeBLOOM, a proposed bedside diagnostic for monitoring the gut microbiome in premature infants in NICU settings, Zamplo, a digital health platform aiming to empower patients and encourage self-management for Fabry disease, SmartForceps used in neurosurgery to name a few.

Conference Schedule

February 29, 2024

09:30-10:00 **Registration and Distribution of Conference Kit**

10:00-11:30 **Inauguration and Welcome Address**

11:30-12:00 **High Tea & Group Photo Session**

12:00-12:45 **Talk by Prof. Debasis Kundu, Indian Institute of Technology Kanpur, India**

"Recent Advances of Non-Linear Regression in Machine Learning"

12:45-13:30 **Talk by Prof. Enrique Zuazua, University of Erlangen-Nuremberg (FAU), Germany**

"Control and Machine Learning"

13:30-14:30 **Lunch**

Parallel Sessions

Paper Presentations		
14:30-15:30	**Track A: Algebra, Analysis & Approximations**	**Track B: Soft Computing, Fuzzy Sets, Decision Making & Operations Research**
15:30-15:45	**Tea Break**	
15:45-17:00	**Paper presentations continued...**	

19:30-21:00 **Dinner**

March 1, 2024

10:00-10:45 Talk by Prof. T. Som, Indian Institute of Technology, Varanasi India

"Some Recent Fixed-Point Results with Applications"

10:45-11:30 Talk by Prof. Sandip Banerjee, Indian Institute of Technology Roorkee, India

"Modeling the dynamics of Hepatitis C virus with combined antiviral drug therapy - Interferon and Ribavirin"

11:30-12:00 Tea/Coffee Break & Group Photo Session

12:00-12:45 Talk by Prof. Shruti Dubey, Indian Institute of Technology (Madras) Chennai, India

"Orthogonal Neural Network - An approach for Solving Delay Differential Equations"

12:45-13:45 Lunch

Parallel Sessions

<table>
<tr><th colspan="3">Paper Presentations</th></tr>
<tr><td rowspan="2">13:45-15:15</td><td>Track C: Differential Equations, Mathematical Modelling and Computational Fluid Dynamics</td><td>Track D: Miscellaneous</td></tr>
<tr><td>Track E: Special Session on Machine Learning Models for Engineering Applications</td><td>Track F: Special Session on From Equations to Insights: Mathematical Models for Water Resources and Climate Change Applications</td></tr>
<tr><td>15:15-15:30</td><td colspan="2">Tea Break</td></tr>
<tr><td rowspan="2">15:30-17:00</td><td>Track C: continued...</td><td>Track D: continued...</td></tr>
<tr><td>Track G: Special Session on Integrating Fuzzy and Hybrid Fuzzy Sets and Systems: A New Paradigm in Decision Making</td><td>Track H: Special Session on Artificial Intelligence, Social Emotional Intelligence and Mathematics: Exploring Synergies</td></tr>
</table>

March 2, 2024

10:00-10:45 **Talk by Prof. Sudipa Chauhan, Institute of Health Economics, Canada**

"Exploring the Dynamics of Health Economics -Significance, Modelling Practices, and Analytical Insights"

10:45-11:00 **Tea/Coffee Break**

11:00-11:45 **Talk by Prof. S. K. Tomar, Panjab University, Chandigarh and J. C. Bose University of Science and Technology, Faridabad, Haryana, India**

"An Approximate Secular Equation of Rayleigh-like Waves in Coated Elastic Half-Space Containing Voids"

Paper Presentations	
11:45-12:45	**Track I: Special Session on Advanced computational modeling approaches in fluid dynamics and artificial intelligence in the analysis of fluid flow process**
	Track J: Special Session on Distribution Theory

12:45-13:15 **Valedictory Function**

13:15-14:15 **Lunch**

Schedule of Paper Presentations

Date: 29/02/2024 ***Time: 2:30 PM-5:00 PM***

Track A: Algebra, Analysis & Approximations

S. No.	Title and Author(s)
1	**Fixed Point Theorems for Suzuki Nonexpansive Mappings in Banach Spaces (JMA-705)** John Sebastian*, Shaini Pulickakunnel
2	**A new estimation of the degree of approximation of functions belonging to Lipschitz class by Borel-Euler summability Method of Fourier Series (JMA-713)** Jitendra Kumar Kushwaha, Radha Vishwakarma
3	**Some Results on New Generalization of Generalized Hypergeometric Function And τ-Gauss Hypergeometric Function (JMA-715)** Komal Singh Yadav, Saurabh Bajpai, Bhagwat Sharan, Ashish Verma*
4	**Contiguous Matrix Functions Relation for the k-Hypergeometric Matrix Function (JMA-717)** Saurabh Bajpai*, Komal Singh Yadav, Nirmal Srivastava, Ashish Verma
5	**Approximation of Lipschitz class by deferred-generalized N¨ORLUND (Dγ β.Npq) product summability means (JMA-718)** Jitendra Kumar Kushwaha, Laxmi Rathour, Lakshmi Narayan Mishra, Krishna Kumar
6	**Geodetic Convexity in the Heisenberg Group (JMA-719)** Prof. Jyorshana V Prajapat*, Anoop Skaria Varghese
7	**A Study of Null Geodesics and Weak Deflection Angle of Kazakov-Solodukhin-Kiselev Blackhole (JMA-742)** Gowtham Sidharth M*, Sanjit Das, Mahalakshmi
8	**Commutative Supersingular Isogeny Diffie Hellman Key Exchange Using Edward Curves (JMA-745)** Krishnaprabha R
9	**Generalization of Some Inequalities for Rational Functions with Prescribed Poles (JMA-748)** Preeti Gupta*, Sunil Hans
10	**On the location of the zeros of a polynomial (JMA-765)** Ashish Mohr, Anchal Dhillon*, Sunil Hans
11	**Approximating Common Fixed Points of Multi-Valued Generalized (α-β)-Nonexpansive Mappings in Banach Spaces (JMA-789)** Sucheta Yadav*, Bhagwati Prasad Chamola
12	**Certain Fractional (p, q)-Derivative Formula for the (p, q)-Analogue of Multivariable Prathima's I-function (JMA-791)** Dinesh Kumar, Nidhi Sahni*, Frederic Ayant

Date: 29/02/2024 ***Time: 2:30 PM-5:00 PM***

Track B: Soft Computing, Fuzzy Sets, Decision Making & Operations Research

S. No.	Title and Author(s)
1	**Minimising Carbon Emissions in a Multi-Objective Fixed Cost Solid Transportation Problem under Intuitionistic Fuzzy Environment (JMA-707)** Divya Sharma*, Dinesh C. S. Bisht, Pankaj Kumar Srivastava
2	**Attribute-Object Ordered Soft Set and its Applications in Decision-Making Problems Based on Comparison of Attributes and Objects (JMA-720)** Sudhir Maddheshiya*, Julee Srivastava
3	**Analyzing Real-Life Problem Solving: The Application and Evaluation of TOPSIS in Multiple-Criteria Decision-Making (JMA-724)** Yograj Singh, Sanskriti Sharma*
4	**Navigating Agricultural Decision-Making: A Comprehensive Review of MCDM Applications in Farming Complexity (2013-2023) (JMA-734)** Yograj Singh, Shriyans Srivatsan Tirucherai*, Vivek Pandey
5	**A Note on Fuzzy Baer Subrings (JMA-743)** Dinesh Kute*, Arundhati Warke, Anil Khairnar
6	**Comparative Analysis of Informative Measures in Pythagorean Fuzzy Environment (JMA-744)** Yograj Singh*, Dinesh C.S. Bisht
7	**Clustering Empowerment in Fuzzy Time Series Forecasting: A Comprehensive Review and Analysis (JMA-749)** Gunjan Goyal*, Dinesh C. S. Bisht
8	**Integrated Inventory Management for Seasonal Demand Items: A Model Considering Deterioration and Shortages (JMA-755)** Renu Gautam, Sangeeta Gupta*, Sweta Srivastav
9	**A Study on Distance - Similarity Measures of Intuitionistic Fuzzy Sets and its Applications (JMA-767)** Surbhi Goyal*, Hari Darshan Arora
10	**Neutrosophic fuzzy goal programming approach for multi-objective customized travel package problem (JMA-768)** Debasmita Sarkar*, Pankaj Kumar Srivastava
11	**An Alternative Method for Finding Initial Basic Feasible Solution of Fuzzy Transportation Problem (JMA-785)** Anshika Agrawal*, Neha Singhal
12	**Multiple Attribute Group Decision-Making Based on Novel Similarity Measure Under Linguistic Picture Fuzzy Frame Work (JMA-786)** Barkha Rohtagi*, Rajkumar Verma

Date: 01/03/2024 ***Time: 1:45 PM-5:00 PM***

Track C: Differential Equations, Mathematical Modelling and Computational Fluid Dynamics

S. No.	Title and Author(s)
1.	**A Study on Axisymmetric Vibrations of Linearly Varying Annular FGM Plate Resting on Winkler Foundation (JMA-708)** Sumit Kumar Sharma*, Neha Ahlawat
2.	**Existence of Solutions to Variable Order Fractional Differential Equations with Integral Boundary Conditions and Infinite Delay (JMA-711)** Archana Chauhan
3.	**Asymptotic Attractivity Result for Neutral Functional Differential Equation (JMA-725)** Shantaram Narayan Salunkhe
4.	**Scattering of Water Waves by a Pair of Cylinders in a Channel (JMA-763)** Pankaj Borah
5.	**Analysis of an Epidemic Model using Variational Iteration Method (JMA-774)** Ajay Kumar Agrawal*, Yogesh Gupta
6.	**Excitation of Terahertz Radiation using Gaussian Laser Beams from Spherical Nanoparticles Placed in Magnetic Field (SSE-778)** Moses Simon*, Prashant Chauhan
7.	**A Stochastic Numerical Approach to Study Stagnation Point Carreau Nanofluid Flow Impacted by Thermal Radiation and Activation Energy (JMA-787)** Eman Fayz A. Alshehery*, Eman Salem Alaidarous, Rania. A. Alharbey, Muhammad Asif, Zahoor Raja
8.	**Second-order Harmonic Generation in CNT arrays for THz Wave Emission (JMA-781)** Himani Juneja*, Anuraj Panwar, Prashant Chauhan
9.	**Creep Stress Analysis of Transversely Isotropic Rotating Disc Composed of Functionally Graded Material (JMA-782)** Vikash Ghlawat*, Richa Sharma, Khursheed Alam
10.	**Heat Transfer in Micropolar Fluids: Nonlinear Stability Analysis of Rayleigh–Bénard Convection with Porous Medium, and Internal Heat Generation (JMA-783)** Riya Baby
11.	**Comprehending the epidemic outbreak and its financial implications through mathematical modeling (JMA-788)** Nisha Sharma*, Sumit Kaur Bhatia, Shashank Goel
12.	**New Holographic Dark Energy and Viscosity Effect in Modified f (R, T) Theory (JMA-792)** B. Mangku, M. Srivastava*

Date: 01/03/2024 ***Time: 1:45 PM-5:00 PM***

Track D: Miscellaneous

S. No.	Title and Author(s)
1.	**Hyperplane Absolute Winning Property of Bounded Orbits under Diagonalizable Flows on SL_3(C)/SL_3(O_K) (JMA-709)** Gaurav Sawant
2.	**Radio Mean Labeling of Arrow Graph and its related graphs (JMA-710)** Varsha Rathi*, Sweta Srivastav
3.	**Polynomial generalized splines on star graph and wheel graph (JMA-721)** Radhamadhavi Duggaraju
4.	**Domination Integrity of Generalized Transformation Graphs (JMA-727)** A. Sugirtha*, Y. Therese Sunitha Mary
5.	**Signature Reliability Assessment of Network System by using Universal Generating Function (JMA-736)** Aditi Bisht*, Vidisha Sharma, Shristi Kharola, Akshay Kumar, Mangey Ram
6.	**Markov-Based Reliability Assessment for Ropeway Control Systems (JMA-737)** Divya Chauhan*, Shilpa Yadav, Shristi Kharola, Akshay Kumar, Mangey Ram
7.	**Energy Condition Analysis of Rindler-Type Ellis-Bronnikov Wormholes within the Framework of f(R) Modified Gravity (JMA-738)** M Daniel Ranjan*, Sanjit Das
8.	**Two-Dimensional Weighted K-out-of-n System and its Dynamic Reliability Measures (JMA-740)** Ayush Singh*, S. B. Singh
9.	**Ultraviolet Radiation Index Prediction in India Using Artificial Neural Network (JMA-751)** Sunil K. Sahu*, Manish Gupta, N. Kumar Swamy, Dinesh Bisht
10.	**Hybrid Projective Synchronization in Non-Identical Hyperchaotic Financial Systems via Active Control (JMA-771)** Vikash, Khursheed Alam*
11.	**Comparative Study of Medical Image Enhancement using Hamacher and Dombi T-conorms (JMA-780)** Neha Chandra*, Anuj Bhardwaj

Schedule of Oral Presentations in Special Sessions

Date: 01/03/2024 ***Time: 1:45 PM-3:15 PM***

Track E: Special Session on Machine Learning Models for Engineering Applications

Session Chair: Dr. Shaveta Arora & Dr. Vikas Mittal

S. No.	Title and Author(s)
1.	**An End-to-end Autonomous Driver Drowsiness Monitoring System (SSE-301)** Srishti Vashishtha*, Suchika Sachdeva, Manisha Saini
2.	**Result Prediction of Cricket Match utilizing Decision Tree Algorithm (JMA-701)** Gaurav Kumar Nigam
3.	**SkinSage - Lesion Diagnosis using Deep Learning Techniques (JMA-729)** Nimish*, Paarth Bhardwaj, Vaibhav Bhargava, Shivendra Singh
4.	**Yoga Posture Analysis Using Deep Learning (JMA-730)** Geetika Munjal, Anshumaan Garg*, Sagar Wadhwa
5.	**Machine Learning Based Tomato Plant Disease Identification Using Data Augmentation (JMA-793)** Kanika Vashist*, Vanshika Gupta, Ayush Gupta, Richa Gupta

Date: 01/03/2024 ***Time: 1:45 PM-3:15 PM***

Track F: Special Session on From Equations to Insights: Mathematical Models for Water Resources and Climate Change Applications

Session Chair: Dr. A. Naresh & Dr. M. Harini Reddy

S. No.	Title and Author(s)
1	**A Robust Resilient Distributed Market based on Blockchain Technology and Smart Contracts Presentation (JMA-753)** Manjula Rangu*, Naveen Chauhan
2	**Palm tree Diseases and Classification (JMA-754)** M. Soujanya*, E. Aravind
3	**Analysis of Extreme Precipitation Indices Over Urban Region: A Case Study (JMA-757)** Aadhi Naresh*, Suram Anil, M. Sagar Kumar, M. Gopal Naik, Srinivasulu Ale, Fouad H Jaber
4	**A Study on Rutting Resistance and Microlevel Analysis on Bioenzyme Stabilized Subgrade Soils (JMA-758)** Mane S R Rohith*, R. Srinivasa Kumar

5	**Safeguarding the Lifeline: Assessing and Strengthening the Urban Water Supply Distribution System in Hyderabad, Telangana State, for Sustainable Development and Public Health (JMA-759)** Mane S R Rohith*, Aadhi Naresh, G. Ramakrishna, K. Lavanya, Dinesh. C. S. Bisht
6	**An AI Based Platform for Rheumatoid Arthritis Disease Using Cascade Inception Based Deep CNN Classification with Transfer Learning Inference (JMA-762)** Saloni Fathima*, G. Shankar Lingam

Date: 01/03/2024 ***Time: 3:30 PM-5:00 PM***

Track G: Special Session on Integrating Fuzzy and Hybrid Fuzzy Sets and Systems: A New Paradigm in Decision Making

Session Chair: Dr. Rashmi Singh & Dr. Akhilesh Kumar Singh

S. No.	Title and Author(s)
1.	**Fuzzy Hybrid Approaches in Construction Engineering and Management: Advancing Project Performance and Sustainability (SSE-101)** Shivani*, Neha Bhardwaj
2.	**Application of Fuzzy Techniques in Medical Diagnosis (SSE-102)** Geetika*, Ankita Gaur
3.	**Next-Generation Indian Vaccine Supply Chain: An Integrated Fuzzy DEMATEL ISM approach (SSE-103)** Ambuj Kumar*, Om Ji Shukla, Shailesh Mani Pandey, Rajnish Singh
4.	**Korovkin Type Approximation Theorems Via Generalized Weighted Norlund-Euler Statistical Convergence in Fuzzy Spaces (SSE-107)** Parveen Bawa*, Neha Bhardwaj
5.	**L-Fuzzy Rough Preproximity Spaces (SSE-108)** Virendra Kumar*, Surabhi Tiwari
6.	**Different Approaches to Decision-Making Utilizing Hesitant Fuzzy Soft Sets (SSE-109)** Rashmi Singh, Prakhar Singh*
7.	**Soft Sets and Hybrid Soft Sets: A Systematic Review of Methodologies, Applications, and Advancements (SSE-110)** Jahanvi*, Rashmi Singh, Akhilesh Kumar Singh
8.	**Fuzzy Effect Algebras and Decomposition Theorems (JMA-714)** Sarvesh Kumar Mishra*, Mukesh Kumar Shukla, Akhilesh Kumar Singh

Date: 01/03/2024 ***Time: 3:30 PM-5:00 PM***

Track H: Special Session on Artificial Intelligence, Social Emotional Intelligence and Mathematics: Exploring Synergies

Session Chair: Prof. (Dr.) Amit Srivastava & Dr. Lakhveer Kaur

S. No.	Title and Author(s)
1.	**Time Series Analysis for Predicting Anomaly Using Prophet Models (SSE-501)** Pooja Anand*, Mayank Sharma, Anil Sarolia
2.	**Prediction of Road Crash Attributes and Exploring Imbalance Learning Methods** **(SSE-503)** Sumit Srivastava*, Anantika Johari
3.	**Signcryption Scheme for Secure Voting Empowered by Lattice-Based Cryptography (SSE-504)** Sourav Choudhary*, Rifaqat Ali
4.	**Virtual Design System for Explainable AI-Based Product Packaging Optimization through Machine Vision (SSE-505)** Neeraj Bhagarva, Sumit Srivastava, Deepshikha Saxena*
5.	**REUNIR: A Prototype for A Smart and Ahead-of-its-Time Video Conferencing Web Application (JMA-722)** Abhinav Sinha*, Chitwan Bindal, Rhythm Shandlya, Ashish Kumar, Shruti Gupta
6.	**Identification and Classification of Glaucoma using Deep Learning based AI Model (JMA-756)** Aayush Srivastava*, Amit Rawat, Ananya Singh, Nayanpath Jhunjhunwala
7.	**Recognition of Handwritten Modified Devanagari Characters Using Deep Learning on Augmented Dataset (JMA-790)** Khushi Sinha*, Eshan Marwah, Richa Gupta
8.	**Study of Unreliable Finite Queue with Control Policies and Service Interruptions** **(SSE-779)** Aditya Pratap Singh*, Amita Bhagat

Date: 02/03/2024 ***Time: 11:45 PM-12:45 PM***

Track I: Special Session on Advanced computational modeling approaches in fluid dynamics and artificial intelligence in the analysis of fluid flow process

Session Chair: Dr. K. Lavanya & Er. M. Mohan Raju

S. No.	Title and Author(s)
1	**Simulation Using Computational Fluid Dynamics in the Examination of Ripening Chamber for Process Engineering Investigations (SSE-601)** K. Lavanya*, Dinesh. C. S. Bisht, M. Harini Reddy
2	**Utilizing Google Earth Engine Database for Enhanced Soil Estimation through Advanced RUSLE Modeling (SSE-602)** M.Karunya*, K. Lavanya, A. Naresh
3	**Mathematical Modelling of Thin Layer Drying Kinetics of Freeze-Dried Carrot Slices (SSE-603)** K. Lavanya*, N. Vinoda, M. Karunya
4	**Soil Water Assessment Tool (Swat) To Model Sediment Transport in Peddavagu River, A Tributary of Godavari River Basin in India (SSE-604)** M. Harini Reddy*, N. Manikumari
5	**Study and Importance of Distributed Generation (SSE-605)** M. Harika Reddy*, G. Balaji, J.B.V. Subrahmanyam

Date: 02/03/2024 ***Time: 11:45 PM-12:45 PM***

Track J: Special Session on Distribution Theory

Session Chair: Dr. Rama Shanker and Dr. Kamlesh K. Shukla

S. No.	Title and Author(s)
1	**POWER UMA Distribution with Properties and Applications to Model Data from Biomedical Sciences (SSE-801)** Rama Shanker, Jyotirmoyee Baishya*, Mousumi Ray, Hosenur Rahman Prodhani
2	**POWER KOMAL Distribution with Properties and Application to Model Failure Time Data from Engineering (SSE-802)** Rama Shanker, Mousumi Ray*, Hosenur Rahman Prodhani
3	**Weighted KOMAL Distribution with Properties and Applications to Model Failure Time Data from Engineering (SSE-803)** Rama Shanker, Mousumi Ray, Hosenur Rahman Prodhani*
4	**A Quasi Poisson-Garima Distribution with Properties and Applications (SSE-804)** Rama Shanker, Riki Tabassum*
5	**A New Quasi Poisson-Sujatha Distribution with Properties and Applications (SSE-805)** Rama Shanker*, Kamlesh Kumar Shukla
6	**Availability and maintenance modeling of a repairable system incorporating a hybrid hazard rate model (JMA-739)** Geeta Chand
7	**Power transformed exponential-Poisson distribution: properties and stress-strength reliability (SSE-776)** Sayak Pal

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