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DEPARTMENT OF
MATHEMATICS
BITS PILANI
HYDERABAD CAMPUS

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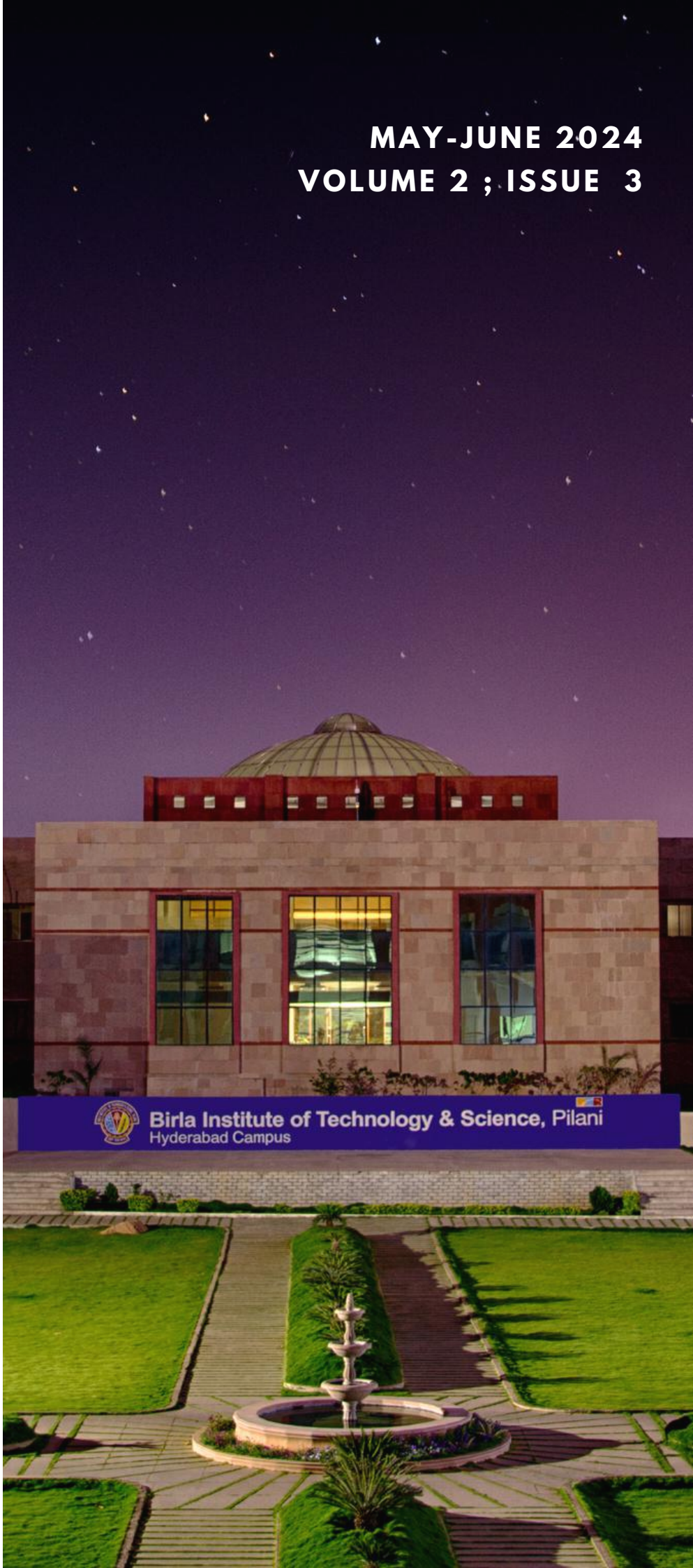

innovate achieve lead

About Us

The Department of Mathematics was established in 2008, along with the Hyderabad Campus of BITS Pilani. Presently, the department offers Integrated MSc, PhD in Mathematics, and Minor in Data Science in collaboration with the Computer Science Department. We also offer various courses and programs to industry professionals through Work Integrated Learning Programs (WILP).

The department has 28 faculty members, of which 3 are professors, 12 are associate professors, and 13 are assistant professors. Our faculty members are actively engaged in conducting research in multi-dimensional areas of Mathematics such as Algebra, Analysis, Applied Statistics, Computational Fluid Dynamics, Cosmology & Relativity, Cryptography, Differential & Integral Equations, Graph Theory, Mathematical Modeling, Number Theory, and Quantum information.

Since its establishment, the department has awarded 22 PhDs, the recipients of which are now working in reputed institutions or pursuing Post-Doctoral research abroad. Currently, the department has 67 PhD students.

The department has a well-furnished computational lab with 20 computers equipped with MATLAB, Mathematica and Statgraphics. It has one main node and two computational nodes. This is supported by the FIST grant received by DST, Govt. of India.

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> Mathematics is, in its own way, the poetry of logical ideas.
>
> -- *Albert Einstein*

EVENTS

Persona Grata

Academic Visits

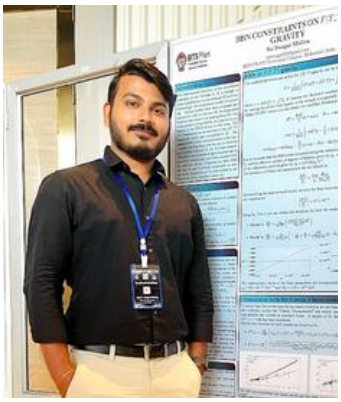
Prof. P K Sahoo delivered an invited talk at the International Conference on Gravitation, Astrophysics and Cosmology (ICGAC 2024) held at GLA University, Mathura during 14-16 June 2024.

Siddheshwar Atmaram Kadam visited Inter-University Centre for Astronomy and Astrophysics (IUCAA) Pune during 16-23 June 2024.

Achievements

Raja Solanki was given the "Best Paper" award for his paper "Extended Bose-Einstein condensate dark matter in f(Q) gravity".

Travel Grants



Sai Swagat Mishra received financial grant from the Anusandhan National Research Foundation (ANRF), SERB under International Travel support (ITS) scheme to attend COSMOGRAVITAS held at the Center for theoretical Physics, Mahidol University, Thailand during 10-14 June 2024. At this conference, he presented a poster titled "BBN constraints on f(T,T) gravity".

Sangeeta Dhawan received financial grant from the Anusandhan National Research Foundation, SERB DST, Government of India under International Travel support scheme and local financial support from ISDE to attend the 29th International Conference on Difference Equations and Applications held at International Society of Difference Equations (ISDE), Paris, France during 24-28 June 2024. She presented a paper titled "Hadamard Fractional Calculus on Nabla Time scales".

Conferences and Workshops

Ashwini S attended a workshop on "Stochastic processes and applications" conducted at IIT Guwahati during 13-25 May 2024.

Kailash Swami attended a workshop on "Recent Advances in Fluid Flow problems" conducted at VIT Andhra Pradesh during 25-29 May 2024.

Sunita Kumawat attended the 2nd International Conference on "Mechanical Engineering : Researches and Evolutionary Challenges" (online) conducted at NIT Warangal during 29-31 May 2024.

Ruddarraju Amrutha attended the International Conference on Lie Algebra and Number theory held at NIT Calicut during 10-14 June 2024.

Sayantan Ghosh delivered a talk titled "Qualitative Analysis of Scalar Field Cosmology Using Dynamical System Analysis" at "Cosmogravitas" held at Center for theoretical Physics, Mahidol University, Thailand during 10-14 June 2024.
He also delivered a talk titled "Dynamical system analysis of DBI scalar field cosmology in coincident f(Q) gravity" at the International Conference on Gravitation, Astrophysics and Cosmology at GLA University, Mathura during 14-16 June 2024.

PhD Awardees

Scholar: **Mr. Vipin V.**

PhD thesis: **Mathematical Modeling, Prediction and Design Optimization of Wave Energy Converter Devices**

Supervisor: **Prof. Santanu Koley**

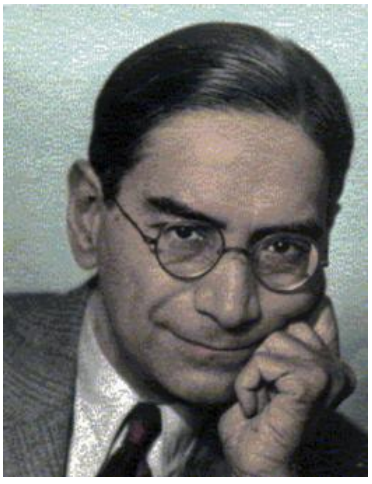
Final Viva-voce: **14 June 2024**

Publications

* indicates Q1 journal

- **Bhawna** and **Kumar, M.**, 2024. Special affine Fourier transform of tempered distributions and pseudo-differential operators. *Integral Transforms and Special Functions*, pp.1-16.
- **Jaybhaye, L.V.**, **Solanki, R.** and **Sahoo, P.K.**, 2024. Bouncing cosmological models in f (R, Lm) gravity. *Physica Scripta*, 99(6), p.065031.
- **Swami, K.C.**, **Koley, S.** and Panduranga, K., 2024. Mathematical modeling of water waves interaction with trapezoidal-shaped breakwater in the presence of current. *Waves in Random and Complex Media*, pp.1-27.
- **Tayde, M.** and **Sahoo, P.K.**, 2024. Exploring wormhole solutions with global monopole charge in the context of f (Q) gravity. *The European Physical Journal C*, 84(6), p.643*
- **Patro, T.**, Mukherjee, K. and **Ganguly, N.**, 2024. Quantum channels and some absolute properties of quantum states. *Quantum Information Processing*, 23(6), pp.1-26.
- Anupindi, S.S.S. and **Alphonse, A.M.**, 2024 The Boundedness of Fractional Hardy-Littlewood Maximal Operator On Variable ℓp(·)(Z) Spaces Using Calderon-Zygmund Decomposition. *The Journal of the Indian Mathematical Society*, 91(1-2), pp. 237–252.
- **Alphonse, A.M.** and Anupindi, S.S.S., 2024 Commutator For Singular Operators On Variable Exponent Sequence Spaces And Their Corresponding Ergodic Version. *Australian Journal of Mathematical Analysis and Applications,* 21(1), pp.21.
- Imam, F. and **Gopal, S.**, 2024. Periodic points of solenoidal automorphisms in terms of adeles. *Monatshefte für Mathematik*, pp.1-11.
- Arora, S., Moraes, P.H.R.S. and **Sahoo, P.K.**, 2024. Energy conditions in the f(R,L,T) theory of gravity. *The European Physical Journal Plus,* 139(6), 542.
- **Bhat, A.**, **Solanki, R.** and **Sahoo, P.K.**, 2024. Extended Bose-Einstein condensate dark matter in f(Q) gravity. *General Relativity and Gravitation*, 56(5), p.63.*
- **Gadbail, G.N.** and **Sahoo, P.K.**, 2024. Modified f(Q) gravity models and their cosmological consequences. *Chinese Journal of Physics*, 89, pp.1754-1762.

Know a Mathematician: P.C. Mahalanobis



Prasanta Chandra Mahalanobis (1893-1972) was a renowned Indian statistician and physicist, best known for the Mahalanobis distance, a key measure in multivariate analysis. He founded the Indian Statistical Institute (ISI) in 1931, advancing statistical research and education. Mahalanobis pioneered large-scale sample surveys and played a crucial role in India's second Five-Year Plan, focusing on industrialisation. His innovative methods improved data collection accuracy, influencing statistics and economic planning. Awarded the Padma Vibhushan in 1968, Mahalanobis's legacy endures in the fields of statistics and economics, both in India and internationally.

> **The fundamental aim of statistics is to give determinate and adequate knowledge of reality with the help of numbers and numerical analysis.**

Our Faculty

Prof. J Jagan Mohan

Prof. Jonnalagadda Jagan Mohan is an Associate Professor at the Birla Institute of Technology and Science Pilani (BITS Pilani) Hyderabad Campus. After completing his M.Sc. in Mathematics from Andhra University, he pursued further studies to earn his M.Sc. in Statistics and M.Phil. in Mathematics from Osmania University and Sri Venkateswara University, respectively. He has completed his Ph.D. in Mathematics from Jawaharlal Nehru Technological University Kakinada.

He started his teaching career as an Assistant Professor of Mathematics at Maharajah's Postgraduate College, Vizianagaram, beginning in July 2004 and ending in November 2006. He then held the Assistant Professor position at Vignan's Institute of Information Technology, Visakhapatnam, from November 2006 to July 2011. Subsequently, he served as an Assistant Professor (Senior Scale) at Manipal Institute of Technology, Manipal University, Manipal, from July 2011 to August 2012, and as an Assistant Professor (Senior) at Vellore Institute of Technology, Vellore, from August 2012 to June 2013. Finally, he joined as an Assistant Professor at Birla Institute of Technology & Science Pilani, Hyderabad, in June 2013. In June 2021, he was promoted to the position of Associate Professor.

His enthusiasm for teaching shines through the various courses he teaches at BITS. He covers numerous general, project WILP, and PhD courses. He also guided many students in their PhD studies. He has guided Dr. N. Shobanadevi during her Ph.D. at VIT University. At BITS Pilani, Hyderabad Campus, he supervised Dr. Basua Debananda, Dr. Ravilisetty Revathi, and Dr. N. S. Gopal during their Ph.D. Ms. Sangeeta Dhawan is presently pursuing her Ph.D. under his guidance.

Prof. Jagan Mohan is incredibly passionate about mathematics and has made remarkable contributions. His research has focused on Differential Equations, Difference Equations, Fractional Calculus, and Nonlinear Analysis, resulting in numerous publications widely recognized and cited over five hundred times. Prof. Jagan has established himself as a prominent figure in mathematics, having authored over 60 scholarly documents and presented numerous papers at national and international conferences.

In July 2015, he received international recognition, which led to his visit to the Bialystok Institute of Technology in Poland. This visit was sponsored by the International Travel Grant (ITS) from the SERB, Government of India. Additionally, he travelled to the Department of Mathematics at the University of Dayton in Ohio to collaborate with Prof. Paul Eloe from May 2017 to July 2017 and from May 2018 to June 2018. In addition to his travels, he is known for his reviews in Mathematical Reviews, American Mathematical Society, and innumerable internationally reputed Journals.

His unwavering dedication to improving the institute extends far beyond academics. He has actively participated in a wide range of institutional activities, including fulfilling PS 1 Duty at NALCO, Damanjodi & HAL, Koraput, and carrying out BITSAT Duty at Andhra Loyola College, Vijayawada, and WISTAM, Visakhapatnam. Furthermore, he has made significant contributions as the convenor of the Departmental Research Committee, Member of the Library Committee, and Non-Resident Warden of Krishna Bhavan. He is now the Warden of Krishna Bhavan and a member of the Departmental Research Committee.

Our Faculty

Prof. N Kishore Kumar

Prof. Naraparaju Kishore Kumar is an esteemed faculty in the Department of Mathematics at BITS Pilani, Hyderabad Campus. He completed his Ph.D. from the Indian Institute of Technology (IIT) Kanpur in June 2007. With a robust academic and research background, Prof. Kishore Kumar has extensive experience in teaching and research, contributing significantly to the field.

Prof. Kishore Kumar's professional journey began as a Lecturer in Mathematics at the National Institute of Technology (NIT), Warangal, India, from December 2006 to December 2007. Following this, he served as a Postdoctoral Assistant at the Max-Planck Institute for Mathematics in the Sciences, Leipzig, Germany, from January 2008 to December 2010. Upon his return to India, he joined the Indian Institute of Technology, Gandhinagar, as an Assistant Professor from February 2011 to December 2013. Subsequently, he moved to BITS Pilani, Hyderabad Campus, where he served as an Assistant Professor from December 2013 to May 2021 before being promoted to Associate Professor in June 2021.

At BITS Pilani, Hyderabad Campus, Prof. Kishore Kumar has taught various courses, reflecting his extensive knowledge and expertise in mathematics. His courses include Mathematics I, II, III, Probability and Statistics, Numerical Solutions to Ordinary Differential Equations, Real Analysis, and Functional Analysis, among many others.

Prof. Kishore Kumar has also been actively involved in several sponsored research projects. Notably, he was the Principal Investigator for the project "Construction of arbitrary Tensor Networks using cross approximation techniques," funded by the National Board of Higher Mathematics, India. Another project, "Spectral element methods for elliptic and parabolic interface problems in R2 on parallel computers," also saw him as Principal Investigator. This project was collaborative with Prof. Pankaj Biswas from NIT Silchar, India.

Additionally, he is currently a Co-Principal Investigator on the project "Spectral element solvers for stationary and non-stationary Stokes equations," in collaboration with Prof. Subhashree Mohapatra from IIIT Delhi, funded by the National Board of Higher Mathematics, India.

Prof. Kishore Kumar has received several accolades throughout his career. He was awarded the Max-Planck-Gesellschaft Stipend for his postdoctoral position at the Max-Planck Institute for Mathematics in the Sciences, Leipzig, Germany. Additionally, he received a Graduate Assistantship from IIT Kanpur from August 2001 to July 2006.

Prof. Kishore Kumar's research interests primarily focus on numerical solutions to elliptic partial differential equations, spectral element methods, finite element methods, numerical linear algebra, and tensor decompositions. His dedication to advancing these fields is evident in his ongoing research and guidance to his students; Ms. Shivangi Joshi is pursuing a Ph.D. under his guidance.

Prof. N. Kishore Kumar exemplifies academic excellence and dedication to advancing mathematical sciences. His impactful teaching, pioneering research, and numerous accolades underscore his contributions to the field. At BITS Pilani, Hyderabad Campus, he inspires students and peers, fostering a vibrant academic environment. His work advances theoretical understanding and offers practical solutions, solidifying his reputation as a leading mathematician and educator.

First Degree Alumni

Yalam Raviteja

Graduated in 2018, with B.E. in Electrical and Electronics Engineering and M.Sc. In Mathematics from BITS Pilani, Hyderabad Campus. Studied propagation of seismic waves in different media. And effect of the Boundary between two media on the wave propagation. Completed a thesis study on Conversion of Human Circulatory System into an analogous Electrical Circuit and the Effect of Different parameters on Blood Flow based on the electrical Circuit. Currently pursuing a career in the Software industry as a Data Governance Consultant.

Karran Pandey

Karran is a third year CS PhD student at the Dynamic Graphics Project lab in the University of Toronto advised by Karan Singh, and a research intern at the NVIDIA Toronto AI lab. His current research focuses on using geometry processing and machine learning to design creative tools to model, edit and understand graphical representations such as 3D models, images and sketches. His research on creative interfaces has led to three publications at SIGGRAPH and CVPR during his PhD journey. In the past, he has also interned at Adobe Research San Jose working on creative controls for text-to-image diffusion models. Soon after graduating from BITS, Karran also had a brief stint as a research assistant at the visualization and graphics lab at the Indian Institute of Science before beginning his PhD where he worked on Computational Topology and Scientific Visualization.

Venkateshwara Rao

Graduating in 2018 with a B.E. in EEE and M.Sc. in Mathematics from BITS Pilani Hyderabad campus, Venkateshwara leverages his expertise in Artificial Intelligence (AI) and Data Science (DS) to leads and spearheads the AI and Engineering team at Chryselys, where his team is working on harnessing State of the Art (SoTA) AI technology and LLMs to revolutionize how Pharma organizations manage their business and conduct market studies and analyse pharmaceutical data, improving Clinical Operations (ClinOps) through advanced Learning Management Systems (LMS), and improve customer engagement. Prior to his current role, he served as a DS Manager, leading data driven initiatives and using mathematical modelling techniques to solve complex problems and develop production grade applications. His passion lies in tackling real-world problems and delivering impactful and innovative solutions through cutting-edge AI and scalable cloud technology.

PhD Alumni

Dr. Tusharakanta Pradhan

Assistant Professor (Guest Faculty), Basic Science & Humanities.
Government college of Engineering, Keonjhar, Odisha

PhD Thesis: Studies on Pseudo-differential operators and their applications
Supervisor: Prof. Manish Kumar
Co Supervisor: Prof. Michael Alphonse
Year of Conferral : 2022

Dr. Pradhan's area of research is pseudo-differential operators, which originated as a powerful tool for studying partial differential equations and have become a field of independent research. These operators are essential in modern differential equation theory, offering a powerful and flexible way to apply Fourier techniques to integral and partial differential operators. Pseudo-differential operators have been defined on various types of spaces using the linear canonical transform and the quadratic-phase Fourier transform. The linear canonical transform is an efficient technique for studying the properties of pseudo-differential operators in various spaces.He has published nine research papers in international and national SCI journals and presented a research paper at an international conference. In addition to his thesis work, he has also published a book chapter with Springer.

Dr. Ravilisetty Revathi

Assistant Professor, School of Technology
Woxsen University, Hyderabad

PhD Thesis: Numerical Solutions to Compressible Flow Problems
Supervisor: Prof. Addepalli Ramu
Co Supervisor: Prof. Jagan Mohan Jonnalagadda
Year of Conferral : 2022

Dr. Revathi's research revolves around the field of Computational Fluid Dynamics, with a particular focus on Compressible Flows and Shock Waves. She has authored several papers published in esteemed international journals, and her findings have been presented at numerous national and international conferences, underscoring the relevance and impact of her work within the academic community. Her research excellence was recognized with the best paper award at ICMTA-2020, organized by SRMIST, Kattankualthur, Tamil Nadu. Currently, she works as an Assistant Professor at the School of Technology, Woxsen University, Hyderabad.

BITS Pilani
Hyderabad Campus
Department of Mathematics

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