BEYOND INFINITY

From HOD's Desk

Dr. Pallavi Mahale

Mathematics is an essential and integral part of the growth and developments of all branches of Science and Technology. For every scientific and engineering research, Mathematics plays an important role. In the words of famous mathematician Stefan Banach, "Mathematics is the most beautiful and most powerful creation of the human spirit." I am delighted to present the sixth edition of our department's Newsletter "Beyond Infinity" in the month of March-2024. This newsletter has an objective to provide a platform for faculty members, staff and students to present their skills, innovative ideas in Mathematics. In the newsletter, we publish achievements, accomplishments and events of the department of Mathematics. I thank the editorial board for their efforts to make this edition interesting and innovative. I hope this newsletter gives you glimpses of research, teaching and overall activities of the Mathematics department.
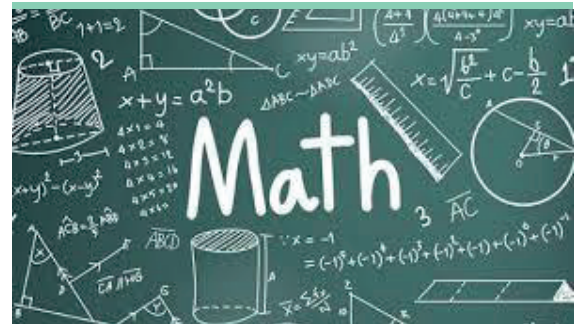
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PUBLICATIONS

1. A. R. Lalke, G. P. Singh, A. Singh : Late-time acceleration from ekpyrotic bounce in gravity, International of Geometric Methods in Modern Physics, World Scientific, Vol. 20, No. 8, 2350131, 2023.

2. Chakravarthy, P.P., Shivhare, M. Numerical solution of a time dependent singularly perturbed delay differential equation on an exponentially graded mesh. Indian J Pure Appl Math (2023).https://doi.org/10.1007/s13226-023-00442-x

3. Podila, P.C., Sundrani, V. A non-uniform Haar wavelet method for a singularly perturbed convection–diffusion type problem with integral boundary condition on an exponentially graded mesh. Comp. Appl. Math.42, 216 (2023). https://doi.org/10.1007/s40314-023-02359-x.

4. P. Pramod Chakravrthy, Vishwas Sundrani: Haar wavelets for numerical solution of a second order singularly perturbed reaction-diffusion problem with discontinuities, TWMS Journal of Applied and Engineering Mathematics, accepted on 6-3-2023

5. Mahale, P., Kumar, A. Modified version of a simplified Landweber iterative method for nonlinear ill-posed operator equations. Indian J Pure Appl Math (2023). https://doi.org/10.1007/s13226-023-00474-3

6. Mahale, P., Singh A. Iterative Lavrentiev regularization method under a heuristic rule for nonlinear ill-posed operator equations, Electronic Transactions on Numerical Analysis, Volume 58, pp. 450–469, 2023.

7. Mahale, P., Singh A. Convergence analysis of simplified Gauss-Newton iterative method under a heuristic rule, Accepted for publication in "Proceeding-Mathematical Sciences" Published by the Indian Academy of Sciences.

8. M. Devakar, S. Mayuri, A flow of Newtonian fluid through annular region between curved pipes: Analytical study, International Journal of Modern Physics B, To be appeared, https://doi.org/10.1142/S0217979224503375. Accepted 7 June 2023.

9. P. Roul, Design and analysis of efficient computational techniques for solving a temporal fractional partial differential equation with the weakly singular solution, Mathematical Methods in the Applied Sciences, DOI: 10.1002/MMA.9744, 2023.

10. P. Roul, Vikas Rohil, A high-accuracy computational technique based on $L2-1_{\sigma}$ and B-spline schemes for solving the nonlinear time-fractional Burgers' equation, Soft Computing, DOI: 10.1007/s00500-023-09413-0, 2023.

11. P. Roul, Vikas Rohil, An efficient numerical scheme and its analysis for the multiterm time-fractional convection-diffusion-reaction equation, Mathematical Methods in the Applied Sciences, 46 (16), 16857-16875, 2023.

12. M. Izadi, P. Roul, An effective numerical model for coupled systems of Emden-Fowler equations via shifted airfoil functions of the first kind, Mathematical Modelling and Analysis, Accepted, 2023 (SCIE). 13. P. Roul, VMKP. Goura, R. Agarwal: An optimal computational method for a general class of nonlinear boundary value problems, Journal of Mathematical Chemistry, 61, 1842–1878, 2023.

14. P. Roul, T. Kumari, An efficient computational technique for solving a time-fractional reaction-subdiffusion model in 2D space, Accepted, Computers and Mathematics with Applications, 2024 .

15. D.K. Patel and Bhupeshwar, Finding the best proximity point of generalized multivalued contractions with applications, Numerical Functional Analysis and Optimization 2023, DOI - 10.1080/01630563.2023.2267294.

16. D.K. Patel, Bhupeshwar and D. Gopal, Discussion on the Existence Problems of Fixed Circle in Metric Spaces, Boletim da SociedadeParanaense de Matemática (Accepted in August-2023)

17. P Karan, S Pradhan, N Nandy: Stationary queue and server content distribution of a bulk service vacation queue with N-policy and set up time, Sadhana, 2023 (Accepted)

18. Sharma, K., Singh, V. P., Ebrahimnejad, A., & Chakraborty, D. (2023). Solving a multi-objective chance constrained hierarchical optimization problem under intuitionistic fuzzy environment with its application. Expert Systems with Applications, 217, 119595.

19. Sharma, K., Singh, V. P., Poojara, B., Ebrahimnejad, A., & Chakraborty, D. (2023). An optimization method to solve a fully intuitionistic fuzzy non-linear separable programming problem. RAIRO: Operations Research (2804-7303), 57(6).

20. Singh, V. P., Sharma, K., Singh, B., Ebrahimnejad, A., & Chakraborty, D. (2023). Fermatean fuzzy vehicle routing problem with profit: solution algorithms, comparisons and developments. Sādhanā, 48(3), 166.

21. Singh, V. P., Sharma, K., & Chakraborty, D. (2023). Solving capacitated vehicle routing problem with demands as fuzzy random variable. Soft Computing, 27(21), 16019-16039.

22. K. Mahipal Reddy and N. Vijender, A fractal model for constrained curve and surface interpolation, European physical journal special topics, 232, 1015–1025, 2023.

23. Ashutosh Kumar Karna, Purnima Satapathy, Lie symmetry analysis for the Cargo Leroux model with isentropic perturbation pressure equation of state, Chaos, Solitons and Fractals (Elsevier), 177 (2023), 114241 (1-7).

24. Sourav Bhattacharya, Forcing minimal patterns of triods, Topology and its Applications, 344(2024), 108816.

25. Bhengra, N., Kumhar, R., Gupta, S. and Kundu, S., 2023. Vibrations analysis of propagation of SH-type wave influenced by a point source in a porous piezoelectric layered structure by Green s function approach. Journal of Earth System Science, 132(3), p.135.

BOOKS/CHAPTERS IN BOOKS

1. Pallavi Mahale and Ankush Kumar, Simplified iteratively regularized Gauss-Newton method in Hilbert scales, accepted as chapter in book titled "Inverse Problems, Regularization Methods and Related Topics" in the "Industrial and Applied Mathematics book series" https://www.springer.com/series/13577.

RESEARCH PROJECTS

1. Dr Pallavi Mahale has got approval for SERB CRG grant for the project titled "Study of simplified form of two point iterative gradient methods for regularization of nonlinear ill-posed operator equations".

2. Dr. Sourav Pradhan has got approval from MATRICS project from SERB entitled "Analysis of vacation queues with batch-size-dependent service, N-policy and applications to group screening of blood samples"

FACULTY ACHIEVEMENTS

1. Prof. G. P. Singh s term as Visiting Associate of Inter University Centre for Astronomy and Astrophysics (IUCAA) has been extended for a further period of three years with effect from August 1, 2023.

2. Prof. Pramod Chakravarthy Chair a Paper Presentation Session of the International Conference on Computational Modeling in Science and Engineering (ICCMSE) & 32nd Congress of Andhra Pradesh and Telengana Society for Mathematical Sciences (APTSMS) held during 28-30 October, 2023.

3. Prof. M. Devakar Chair a Paper Presentation Session of the International Conference on Computational Modeling in Science and Engineering (ICCMSE) & 32nd Congress of Andhra Pradesh and Telengana Society for Mathematical Sciences (APTSMS) held during 28-30 October, 2023.

4. Dr. Pradip Roul has been named in the top 2% Scientist of the world for the year 2022 by Stanford University, USA (Declared in October, 2023).

5. Dr. Roul has been appointed as an Editor for Journal of Mathematics and Computer Science (Scopus), Since December, 2023

EXPERT TALKS

A lecture on "The idea of least squares solutions" by Prof. K.C. Sivakumar, IIT Madras

Talk by Prof S. Chandra Sekhara Rao from IIT Delhi

Invited talk on the topic "how well do we really understand dark energy"
by Prof. A. Beesham from University of Zululand, South Africa

FACULTY TALKS/INVITED LECTURES

1. Prof. G. P. Singh has delivered an invited talk under the aegis of continuum math society at NIT Jamshedpur on Feb 1, 2024.

2. Prof. G. P. Singh delivered talks on the theme 'Data Science relevance to Society' and inspire children for scientific temperament, modeling etc on 26th September 2023 at Govt. Ashram English School, Gadchiroli and Govt. Girls Ashram School, Sode, Dist. Gadchiroli . This talk was arranged by National Academy of Sciences, India (NASI), Nagpur Chapter.

3. Dr. Pallavi Mahale has delivered an invited talk titled " Iterative regularization methods for non-linear ill-posed operator equations in Banach spaces" in 11th Applied Inverse Problems Conference 2023 at University of Gottingen, Germany during September 4-8, 2023.

4. Dr. Jyoti Singh has delivered an invited lecture on "Classification of Quadratic forms" in Teacher's Enrichment ATM Workshop Real Analysis, Algebra and Number Theory with some Appplications (2023) organized by G H Raisoni College of Engineering, Nagpur during July 03-08, 2023.

5. Dr. Sourav Pradhan has delivered an invited talk on 'Aspects and applications of differential equations' on 07th July, 2023' at Yeshwantrao Chavan College of Engineering (YCCE), Nagpur.

5. Dr.VijenderNallapu has delivered a plenary talk on "Bernstein Fractal Approximation" in the international conference on Mathematical Modelling and Emerging Trends in Computing organized by Woxen University, Hyderabad, during June 23-25, 2023.

6. Dr. Purnima Satapathy has delivered an invited talk in the symposium "Hyperbolic PDEs and ShockWaves," organized by 89th Annual Conference of the Indian Mathematical Society (IMS), During December 22-25, 2023.

7. Dr. Neelima Bhengra has delievered an invited talk in three-day faculty development program on "RECENT RESEARCH TRENDS IN APPLIED MATHEMATICS AND STATISTICS (RRTAMS-23)" from 12 June to14 June 2023 in virtual mode organized by School of Advanced Sciences, Vellore Institute of Technology, Vellore Campus, Tiruvalam Rd, Katpadi, Vellore, Tamil Nadu, 632014, India.

Invited talk by Prof G.P. Singh at NIT Jamshedpur

Invited talk by Dr. Purnima Satapathy at IMS -2023

Invited talk by Prof. Pallavi Mahale in Applied inverse problem conference 2023, at university of Gottingen, Germany, 4 - 8 September 2023.

STUDENTS ACHIEVEMENTS

(A) PhD VIVA DEFENCE BY RESEARCH SCHOLARS

1. Ms. Aarti Patle successfully completed her PhD Open defense on July 02, 2023.

2. Mr. Vikas Rohilsuccessfully defended his PhD thesis on July 07, 2023.

3. Ms. Trishna Kumari successfully defended her PhD thesis on July 28, 2023.

4. Ms. FarheenShaikh successfully defended his PhD thesis on August19, 2023.

5. Ms. Mayuri Smarthsuccessfully defended her PhD thesis on August 26, 2023.

6. Ms. Kirti Sharma successfully defended her PhD thesis on December15, 2023.

(B) OTHER ACHIEVEMENTS

1. Mr. Tapan Kumar Muduli has presented contributor paper on the topic "Invariant solutions for generalised inhomogeneous-nerautnomous (2+1)- dimensional Konopelchenko Dubrovsky equation through Lie symmetry analysis" organized by 89th Annual Conference of IMS, During December 22-25, 2023)

2. Our Alumni (Awarded Ph.D. in 2016) Dr Katta Ramesh has been featured in Stanford University's list of top 2% scientists worldwide in the years 2021, 2022 and 2023.

3. Biswajeet Singh (MSc student 2022) awarded with PMRF and doing PhD at IIT Madras.

Academic Audit 2022-2023

Ramanujan Day 2023

DEPARTMENTAL ACTIVITIES

Vigilance Day Oath-2023

National Voter's Day Pledge-2023

New Research Scholar Lab

Farewell of Dr. Vikas Rohil

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Editorial Board

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