

Research Thrust Areas/Groups

Annual Report of the Research Group Fractals & Chaos and Mathematical Analysis (Academic Year 2022-2023)

It is one of the three active research groups of the department. Indeed, fractals and chaos are new frontiers of science and important emerging interdisciplinary areas of research nowadays. Almost all branches of sciences and engineering are benefiting from the new insights provided by them. Many shapes found in nature which are highly rough and complex at different scales, fractal interpolation methods are popularly accepted approximation tools in such cases. Mathematical analysis provides the foundation for further development in these areas. The applications of explorations in these areas encompasses various disciplines of sciences, engineering, medicine, business, weather forecasting and several other areas of human activities.

The following faculty members of the department are involved in this group:

- Prof. Alka Tripathi
- Prof. B P Chamola
- Dr. Manish Kumar Bansal
- Dr. Shikha Pandey

There are two research scholars enrolled in the topics related to this group. The teachers involved in this research group have published 4 research papers in various journals and conference proceedings in the current academic year. The detailed list of the publications is given below:

1. S. Pandey, R.S. Rajawat and V.N. Mishra, Approximation properties of modified Jain-Gamma operators preserving linear function, Palestine Journal of Mathematics, Vol 12(2), pp. 169-182, 2023.
2. Beena Bundela, Manish Kumar Bansal and Swati Domaji Kharabe, Euler type integrals associated with the incomplete H and \overline{H} -Functions and its applications, Journal of Rajasthan Academy of Physical Sciences, International Conference on Mathematical and Statistical Computation (ICMSC-2022) Swami Keshvanand Institute of Technology (SKIT), Jaipur, Rajasthan, (India) 3rd -5th March 2022 pp. pp. 99-106, October 2022.
3. Nidhi Jolly and Manish Kumar Bansal, Computable Solution of Fractional Kinetic Equations Associated with Incomplete χ -Functions and M-series, Special Functions in Fractional Calculus and Engineering, H. Singh, H. M. Srivastava, R. K. Pandey(eds), Boca Raton: CRC Press, pp. 95-110, 2023.

4. Priti and Alka Tripathi, "Fuzzy approximation based on fuzzy open (closed) sets", *Mathematical Foundations of Computing*, Vol 6(3), pp. 558-572, 2023. doi: 10.3934/mfc.2023010.

The following papers were presented in the 6th International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2022)" organized by the Department of Mathematics, Jaypee Institute of Information Technology, Noida, India during December 08-10, 2022:

1. Priti and Alka Tripathi, "Rough set model based on union neighbourhoods", pp.A.9.
2. Sucheta Yadav and Bhagwati Prasad, Common Fixed-Point Theorems of Ciric-Type Operators in Metric-Type Spaces, pp.A.10.

All the members of the group were actively involved in various departmental activities besides the successful organization of the 6th International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2022)" which was held during December 08-10, 2022. Further, the following members of the group delivered talks/chaired session in different academic activities in this academic year:

- Prof. Alka Tripathi delivered an invited talk on "Hypothesis Testing and Test of Significance" in Pre-Ph.D. Course workshop on Research Methodology and Research Publication Ethics organized by Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon on 9th February, 2023.
- Prof. Alka Tripathi delivered an invited talk on "National Webinar-Mathematics Everything Around you is Numbers" organized by Balani Infotech Pvt. Ltd. on 21st December 2022.
- Prof. Alka Tripathi delivered an invited talk on "Role of Teachers in Nation Building" organized by Jaypee Business School (JBS) on 7th September 2022.
- Prof. B. P. Chamola delivered an invited talk on "The Essence of Brahma Sphuta Siddhanta" in the National Mathematics Day Celebration of the Department of Mathematics, Jaypee Institute of Information Technology, Noida, UP, held on December 22, 2022.
- Prof. B. P. Chamola was invited as a session expert/Judge for the technical session on "Mathematics, Statistics and Computer Science" for the selection of Young Scientist award during 17th Uttarakhand State Science and Technology Congress (USSTC) 2022-23 at Uttarakhand State Council of Science and Technology (UCOST), Vigyan Dham, Dehradun (Uttarakhand) on 10-12 Feb 2023.
- Prof. B. P. Chamola chaired a session in the 3rd International Conference on "Emerging Trends and Technologies on Intelligent Systems" (ETTIS-2023) organized by C-DAC Noida in association with Petroleum-Gas University of Ploiesti, Romania and the University of Haute-Alsace, France in Online mode held during Feb 23 - 24, 2023.
- Prof. B. P. Chamola chaired a session in 6th International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2022)" supported by Science & Engineering Research Board (SERB),

Department of Science & Technology, Government of India, New Delhi, held during Dec 08-10, 2022 in the Department of Mathematics, Jaypee Institute of Information Technology, Noida, UP.

For strengthening the group activities, a meeting was held on Feb 27, 2023. The following members were present in the meeting:

- Prof. Alka Tripathi
- Prof. B P Chamola
- Dr. Manish Kumar Bansal
- Dr. Shikha Pandey

The main points of the discussion were as follows:

- (i). All the members should try to publish more research papers in the indexed Journals/Conference proceedings.
- (ii). Some academic activities such as expert lectures, seminar, conference etc. related to the themes of the research group may be organized.
- (iii). The other interested faculty members of the department who are working on some related topic of the theme of the group may join this research group.
- (iv). All the members should try to strengthen the outcomes of the group collectively as well as individually.

2021-22

Research thrust areas as recognized by major funding agencies

- (a) Fractals & Chaos and Mathematical Analysis
- (b) Numerical Analysis and Computational Continuum Mechanics
- (c) Statistics, Fuzzy, Information Theory and Operations Research

(a) Fractals & Chaos and Mathematical Analysis

Fractals and chaos are new frontiers of science and important emerging interdisciplinary areas of research nowadays. Wavelets and fractals have significant contributions in the fields of image and signal processing, image compression, data compression and other various approximations. Almost all branches of sciences and engineering are benefiting from the new insights provided by them. Many shapes found in nature which are highly rough and complex at different scales, fractal interpolation methods are popularly accepted approximation tools in such cases. Mathematical

analysis provides the foundation for further development in these areas. The applications of explorations in these areas encompasses various disciplines of sciences, engineering, medicine, business, weather forecasting and several other areas of human activities.

Group Coordinator: Prof. B P Chamola

List of faculty members: 05

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.22	Research Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	26	Ph. D. Awarded=01 Ongoing = 04
2	B P Chamola	Ph.D. (Gurukul Kangri, Hardwar)	Professor	Fixed Point Theory and Fractals	30	Ph. D. Awarded=02 Ongoing = 01
3	Dr. Vipin Chandra Dubey	PhD (M.J.P. Ruhelkhand University Bareilly)	Assistant Professor	General Relativity and Cosmology	16	Ph. D. Ongoing= 01
4	Dr. Shikha Pandey	PhD (NIT Surat)	Assistant Professor	Approximation theory	03	Ph. D. Ongoing= NIL
5	Dr. Manish Kumar Bansal*	PhD (MNIT Jaipur)	Assistant Professor	Fractional Calculus, Special Functions	05	Ph. D. Ongoing= NIL

List of Publications: 06

In Journal

	Title of the Paper	Name of Authors	Title of Journal	Citation Index?	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Comparing entropy inspired holographic dark energy models through statefinder	Mukesh Kumar, Vipin Chandra Dubey and	International Journal of Geometric Methods in		Jaypee Institute of Information Technology,	0

	hierarchy and growth rate of perturbations	Umesh Kumar Sharma	Modern Physics		Noida	
2	Statefinder and O_{m} diagnostics for New generalized Chaplygin gas model	Abdulla Al Mamon, Vipin Chandra Dubey and Kazuharu Bamba	Universe		Jaypee Institute of Information Technology, Noida	0
3	Second Order Partial Derivatives	S. Pandey, D. Obradovic, L.N. Mishra, and V. N. Mishra	Journal of Advances in Mathematics		Jaypee Institute of Information Technology, Noida	
4	Forms of work in interactive teaching of mathematics	D. Obradovi, S. Pandey, L.N. Mishra	Research & Reviews: Journal of Statistics		Jaypee Institute of Information Technology, Noida	

In Conference Proceeding

S. N.	Title of the Paper	Name of Authors	Name of the conference	Name of the Publisher	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Generalized iterated function systems in multi-valued mapping	Prasad B.	Advanced Trends in Mechanical and Aerospace Engineering: Atma-2019	AIP, USA	Jaypee Institute of Information Technology, Noida	0
2	Generalized iterated function systems in multi-valued mapping	Prasad B.	Advanced Trends in Mechanical and Aerospace Engineering: Atma-2019	AIP, USA	Jaypee Institute of Information Technology, Noida	0

Event/Activity Organized:

S.N.	Speaker	Date	Topic
1.	Prof. Mangey Ram, Graphic Era University	March 10, 2022	Scientific Research Paper Writing, Ethics & Publication Opportunities

(b) Numerical Analysis and Computational Continuum Mechanics

The numerical solution of the problems occurring in Computational Continuum

Mechanics is of great practical importance. The governing simultaneous ordinary and partial differential equations remain highly nonlinear and therefore, cannot be solved analytically. These equations can be solved numerically by using numerical methods such as finite element, finite difference, quasi-linearization, mesh free methods.

Group Coordinator: Prof. R. C. Mittal

List of faculty members: 13

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.22	Research Guidance (Last 4 years)
1	R. C. Mittal	Ph.D. (IIT Delhi)	Professor	Numerical Solutions of PDE	42	Ph. D. Awarded = 02 Ongoing = 01
2	A K Aggarwal	Ph.D. (HP University, Shimla)	Professor	Hydrodynamic Stability	29	Ph. D. Awarded=02 Ongoing = 01
3	Lokendra Kumar	Ph.D. (IIT Roorkee)	Professor	Computational Fluid Dynamics	18	Ph. D. Ongoing = 04
4	Pato Kumari	Ph.D. (IIT (ISM) Dhanbad)	Associate Professor	Elastodynamics	14	Ph. D. Ongoing = 02
5	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Associate Professor	Computational Methods, Fuzzy optimization	19	Ph. D. Awarded= 01 Ongoing = 03
6	Yogesh Gupta	Ph.D. (MNNIT, Allahabad)	Associate Professor	Computational Mathematics	17	Ph. D. Awarded = 01 Ongoing = 02
7	Anuj Bhardwaj	Ph.D. (UPTU, Lucknow)	Assistant Professor	Numerical Methods, Wavelets	20	Ph. D. Ongoing = 02
8	Lakhveer Kaur	Ph.D. (Thapar University, Patiala)	Assistant Professor	Exact Solutions & Symmetries for Nonlinear Systems	10	Ph. D. Awarded = 01 Ongoing = 01
9	Dr. Richa Sharma	PhD (JIIT Noida)	Assistant Professor	Elastic-Plastic and creep stress analysis	13	Ph. D. Ongoing= NIL
10	Neha Ahlawat	Ph.D. (IIT Roorkee)	Assistant Professor	Vibration of Plates	04	Ph. D. Ongoing = 02
11	Mohd. Sarfaraz	Ph. D. (Aligarh Muslim University)	Assistant Professor	Variational Inequalities and Inclusions Problems	03	Ph. D. Ongoing= NIL

12	Dr. Nisha Shukla	PhD (JIIT Noida)	Assistant Professor	Computational Fluid Dynamics, Analytical Solutions, HAM, Numerical Solutions	03	Ph. D. Ongoing= NIL
13	Dr. Rajanish Kumar Rai*	PhD (BHU Varanasi)	Assistant Professor	Stability theory and Optimal Control	02	Ph. D. Ongoing= NIL

List of Publications: 15

In Journal

Sl. No	Title of the Paper	Name of Authors	Title of journal	Citation Index	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	On quasi-seismic wave propagation in highly anisotropic triclinic layer between distinct semi-infinite triclinic geomeidia	Kumari, P. and Neha	Applied Mathematical Modelling		Jaypee Institute of Information Technology, Noida	0
2	Numerical Analysis Approach for Models of Covid-19 and Other Epidemics	Ritu, Gupta, Y.	International Journal of Modeling, Simulation, and Scientific Computing		Jaypee Institute of Information Technology, Noida	1
3	LTNE magneto-thermal stability analysis on rough surfaces utilizing hybrid nanoparticles and heat source with artificial neural network prediction	Puneet Rana, Vishal Gupta and Lokendra Kumar	Applied Nanoscience		Jaypee Institute of Information Technology, Noida	
4	Image Authentication Using Block Truncation Coding in Lifting Wavelet Domain	Bhardwaj A., Verma V.S. and Gupta S.	International Journal of Image and Graphics		Jaypee Institute of Information Technology, Noida	0
5	Contrast enhancement of MRI images using morphological transforms and PSO	Wadhwa A., Bhardwaj A.	Multimedia Tools and Applications		Jaypee Institute of Information Technology, Noida	0

6	An Efficient Numerical Simulation of a Reaction-Diffusion Malaria Infection Model using B-splines Collocation	Mittal, R.C., Goel, R. and Ahlawat, N.	Chaos, Solitons & Fractals		Jaypee Institute of Information Technology, Noida	1
7	A cubic B-spline quasi-interpolation algorithm to capture the pattern formation of coupled reaction-diffusion models	Mittal, R.C., Kumar, S., Jiwari, R.	Engineering with Computer		Jaypee Institute of Information Technology, Noida	2
8	Some exact invariant solutions and dynamical structures of multiple solitons for the (2+1)-dimensional Bogoyavlensky-Konopelchenko equation with variable coefficients using Lie symmetry analysis	Kumar, S., Kaur, L., Niwas, M.	Chinese Journal of Physics		Jaypee Institute of Information Technology, Noida	1
9	Nonpolynomial twin parameter spline approach to treat boundary-value problems arising in engineering problems	Srivastava, P.K.	Computational and Applied Mathematics		Jaypee Institute of Information Technology, Noida	0
10	Analysis of chaotic behavior of three-dimensional dynamical systems by a - spline differential quadrature algorithm	Rohila , Rajni and Mittal, R. C. .	Asian-European Journal of Mathematics		Jaypee Institute of Information Technology, Noida	
11	Elastic-plastic axis-symmetrical bending of functionally graded rectangular wide plates	Richa Sharma, Varsha Singhal, Prani Sachan,	Structural Integrity and Life		Jaypee Institute of Information Technology, Noida	
12	Cu-Al ₂ O ₃ /engine oil Williamson hybrid nanofluid flow over a stretching/shrinking Riga plate with viscous dissipation and radiation effect	Nidhi, Lokendra Kumar	Heat Transfer		Jaypee Institute of Information Technology, Noida	0
13	1-Soliton solutions of the (2 + 1)-dimensional Heisenberg ferromagnetic spin chain model with the beta time derivative	Hosseini, K., Kaur, L., Mirzazadeh, M. et al	Optical and Quantum Electronics		Jaypee Institute of Information Technology, Noida	16
14	New Exact Solutions of the (4+1)-Dimensional Fokas Equation Via Extended Version of $\exp(-\psi(\kappa))$ -Expansion Method	Verma, P., Kaur, L.	International Journal of Applied and Computational Mathematics		Jaypee Institute of Information Technology, Noida	1

In Conference Proceeding

S. N.	Title of the Paper	Name of Authors	Name of the conference	Name of the Publisher	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Bilinearization and Analytic Solutions of $(2 + 1)$ -Dimensional Generalized Hirota-Satsuma-Ito Equation	Kaur L.	International Conference on Trends in Computational and Cognitive Engineering	Springer	Jaypee Institute of Information Technology, Noida	0

Event/Activity Organized:

S.N.	Speaker	Date	Topic
1	Prof. Natesan Srinivasan, IIT Guwahati	October 19, 2021	Moving Mesh Methods for Burger's and Navier-Stokes Equations

Sl.No.	Title of the Event/Activity	Teachers/ Lab staff	From date	To Date	Number of participants
01	Faculty Development Program on Recent Techniques for the Solutions of Nonlinear Differential Equations	19	Aug 23, 2021	Aug 28, 2021	83
02	Teacher's Enrichment Workshop (TEW) on "Differential Equations and Mathematical Modelling "	12	Feb 14, 2022	Feb 27, 2022	14

(c) Statistics, Fuzzy, Information Theory and Operations Research

In this age of information revolution, the role of statistics, fuzzy sets, information theory and operations research is of prime importance. The statistical data are not always precise numbers, or vectors, or categories. Real data are frequently what is called fuzzy. Also the results of measurements of such data can be best described by using fuzzy numbers and fuzzy vectors. Statistical analysis methods have to be adapted for the analysis of fuzzy data. Information theory deals with the study of problems concerning information processing, information storage, information retrieval and decision-making. This includes the study of uncertainty measures and various practical and economical methods of coding information for transmission. Operations research is required to deal with wide range of problem-solving techniques applied in the pursuit of

improved decision-making and efficiency, such as simulation, mathematical optimization, queueing theory and other stochastic-process models.

List of faculty members: 09

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.22	Research Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	26	Ph. D. Awarded=01 Ongoing = 04
2	Amit Srivastava	Ph.D. (MNIT Jaipur)	Associate Professor	Information & Coding Theory	21	Ph. D. Awarded = 01 Ongoing = 04
3	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Associate Professor	Computational Methods, Fuzzy optimization	19	Ph. D. Awarded= 01 Ongoing = 03
4	Dinesh C. Singh Bisht	Ph.D. (G.B.Pant University, Utrakhnad)	Associate Professor	Soft Computing	13	Ph. D. Awarded=01 Ongoing = 04
5	Himanshu Agarwal	Ph.D. (IIT Roorkee)	Assistant Professor	Image Processing	08	Ph. D. Ongoing = 03
6	Amita Bhagat	Ph.D. (IIT Roorkee)	Assistant Professor	Queueing Theory	07	Ph. D. Awarded = 01 Ongoing = 01
7	Pinkey Chauhan	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	06	Ph. D. Ongoing = 01
8	Neha Singhal	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	03	Ph. D. Ongoing= 01
9	Dr. Shruti*	PhD (BITS Pilani)	Assistant Professor	Applied Probability, Performance evaluation of Wireless Communication networks	01	Ph. D. Ongoing= NIL

List of Publications: 14

In Journal

Sl. No	Title of the Paper	Name of Authors	Title of journal	Citation Index	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Pareto-optimal solution for fixed-charge solid transportation problem under intuitionistic fuzzy environment	Chhibber, D., Bisht, D. C. S. and Srivastava, P. K.	Applied Soft Computing		Jaypee Institute of Information Technology, Noida	0
2	Strong α -cut and associated membership-based modeling for fuzzy time series forecasting	Goyal, G. and Bisht, D.C. S.	International Journal of Modeling, Simulation, and Scientific Computing		Jaypee Institute of Information Technology, Noida	0
3	Interplay between symmetry, convexity and negation of a probability distribution	Srivastava A. and Tanwar, P.	International Journal of Intelligent systems		Jaypee Institute of Information Technology, Noida	0
4	Controlled Arrival Machine Repair Problem with Working Vacation and Reattempts	Bhagat, A., Sethi, R., Garg, D	International Journal of Mathematical, Engineering and Management Sciences		Jaypee Institute of Information Technology, Noida	0
5	A new dynamic score function approach to optimize a special class of Pythagorean fuzzy transportation problem	Nagar, P., Srivastava, P.K. and Srivastava, A	International Journal of System Assurance Engineering and Management,		Jaypee Institute of Information Technology, Noida	0
6	From fuzzy transportation problem to non-linear intuitionistic fuzzy multi-objective transportation problem: A literature review	Chhibber, D., Srivastava, P.K. and Bisht, D.C S.	International Journal of Modelling and Simulation		Jaypee Institute of Information Technology, Noida	0
7	Optimization of Fuzzy Species Pythagorean Transportation Problem under Preserved Uncertainties	Nagar, P., Srivastava, P.K. and Srivastava, A	International Journal of Mathematical, Engineering and Management Sciences		Jaypee Institute of Information Technology, Noida	0
8	Adaptive neuro-fuzzy approach for prediction of global solar radiation for 25 cities falling under seven	Tikkiwal, Vinay Anand; Singh,	International Journal of Computer Aided		Jaypee Institute of Information Technology,	0

	Köppen climatic zones	SajaiVir; Bisht, Dinesh; Gupta, Hari Om;	Engineering and Technology		Noida	
9	A Hybrid Method for Multi-Criteria Group Decision Making under Pythagorean Fuzzy Environment	Singh, Yograj; Bisht, Dinesh CS	International Journal of Modelling and Simulation		Jaypee Institute of Information Technology, Noida	0
10	State Minimization of General Finite Fuzzy Automata	Kaur, R and Tripathi, A.	International Journal of Mathematical, Engineering and Management Science		Jaypee Institute of Information Technology, Noida	0
11	Gompertz PSO variants for Knapsack and Multi-Knapsack Problems	Chauhan, P., Pant, M., Deep, K.	Applied Mathematics-A Journal of Chinese Universities		Jaypee Institute of Information Technology, Noida	0

In Conference Proceeding

S. N.	Title of the Paper	Name of Authors	Name of the conference	Name of the Publisher	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Real Coded Genetic Algorithm for Selecting Optimal Machining Conditions	Chauhan, P.	International Conference on Scientific and Natural Computing (SNC), 2021	Springer	Jaypee Institute of Information Technology, Noida	0
2	Image Solution of Stochastic Differential Equation of Diffusion Type Driven by Brownian Motion	Himanshu Agarwal	5th International Conference on Computer Vision and Image Processing, Allahabad, India, 2020	Springer	Jaypee Institute of Information Technology, Noida	0

Book/Book Chapter publications

S. N.	Title	Name of Authors	Title of the book/chapters published	Name of the Publisher	Institutional affiliation as mentioned in the publication	N/I
1	Recent Advances in Time series Forecasting	Dinesh C. S. Bisht, Mangey Ram	Recent Advances in Time series Forecasting	CRC Press	Jaypee Institute of Information Technology, Noida	I

Event/Activity Organized:

S.N.	Speaker	Date	Topic
1	Prof. Rajesh Sharma, MNIT Jaipur	December 27, 2021	Nature Inspired Algorithms
2	Dr. Sanjeev Kumar Malik, IIT Roorkee	May 17, 2022	Understanding Machine Learning with Linear Algebra and Optimization Perspectives

Research Thrust Areas/Groups

2020-21

Research thrust areas as recognized by major funding agencies

- (a) Fractals & Chaos and Mathematical Analysis
- (b) Numerical Analysis and Computational Continuum Mechanics
- (c) Statistics, Fuzzy, Information Theory and Operations Research

(a) Fractals & Chaos and Mathematical Analysis

Fractals and chaos are new frontiers of science and important emerging interdisciplinary areas of research nowadays. Wavelets and fractals have significant contributions in the fields of image and signal processing, image compression, data compression and other various approximations. Almost all branches of sciences and engineering are benefiting from the new insights provided by them. Many shapes found in nature which are highly rough and complex at different scales, fractal interpolation methods are popularly accepted approximation tools in such cases. Mathematical analysis provides the foundation for further development in these areas. The

applications of explorations in these areas encompasses various disciplines of sciences, engineering, medicine, business, weather forecasting and several other areas of human activities.

Group Coordinator: Prof. B P Chamola

List of faculty members: 05

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.22	Research Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	26	Ph. D. Awarded=01 Ongoing = 04
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3	Dr. Vipin Chandra Dubey	PhD (M.J.P. Ruhelkhand University Bareilly)	Assistant Professor	General Relativity and Cosmology	16	Ph. D. Ongoing= 01
4	Dr. Shikha Pandey	PhD (NIT Surat)	Assistant Professor	Approximation theory	03	Ph. D. Ongoing= NIL
5	Dr. Manish Kumar Bansal*	PhD (MNIT Jaipur)	Assistant Professor	Fractional Calculus, Special Functions	05	Ph. D. Ongoing= NIL

List of Publications: 06

In Journal

	Title of the Paper	Name of Authors	Title of Journal	Citation Index?	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Comparing entropy inspired holographic dark energy models through statefinder hierarchy and	Mukesh Kumar, Vipin Chandra Dubey and Umesh Kumar	International Journal of Geometric Methods in Modern		Jaypee Institute of Information Technology, Noida	0

	growth rate of perturbations	Sharma	Physics			
2	Statefinder and \mathcal{O}_m diagnostics for New generalized Chaplygin gas model	Abdulla Al Mamon, Vipin Chandra Dubey and Kazuharu Bamba	Universe		Jaypee Institute of Information Technology, Noida	0
3	Second Order Partial Derivatives	S. Pandey, D. Obradovic, L.N. Mishra, and V. N. Mishra	Journal of Advances in Mathematics		Jaypee Institute of Information Technology, Noida	
4	Forms of work in interactive teaching of mathematics	D. Obradovi, S. Pandey, L.N. Mishra	Research & Reviews: Journal of Statistics		Jaypee Institute of Information Technology, Noida	

In Conference Proceeding

S. N.	Title of the Paper	Name of Authors	Name of the conference	Name of the Publisher	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Generalized iterated function systems in multi-valued mapping	Prasad B.	Advanced Trends in Mechanical and Aerospace Engineering: Atma-2019	AIP, USA	Jaypee Institute of Information Technology, Noida	0
2	Generalized iterated function systems in multi-valued mapping	Prasad B.	Advanced Trends in Mechanical and Aerospace Engineering: Atma-2019	AIP, USA	Jaypee Institute of Information Technology, Noida	0

Event/Activity Organized:

S.N.	Speaker	Date	Topic
1.	Prof. Mangey Ram, Graphic Era University	March 10, 2022	Scientific Research Paper Writing, Ethics & Publication Opportunities

(b) Numerical Analysis and Computational Continuum Mechanics

The numerical solution of the problems occurring in Computational Continuum

Mechanics is of great practical importance. The governing simultaneous ordinary and partial differential equations remain highly nonlinear and therefore, cannot be solved analytically. These equations can be solved numerically by using numerical methods such as finite element, finite difference, quasi-linearization, mesh free methods.

Group Coordinator: Prof. R. C. Mittal

List of faculty members: 13

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.22	Research Guidance (Last 4 years)
1	R. C. Mittal	Ph.D. (IIT Delhi)	Professor	Numerical Solutions of PDE	42	Ph. D. Awarded = 02 Ongoing = 01
2	A K Aggarwal	Ph.D. (HP University, Shimla)	Professor	Hydrodynamic Stability	29	Ph. D. Awarded=02 Ongoing = 01
3	Lokendra Kumar	Ph.D. (IIT Roorkee)	Professor	Computational Fluid Dynamics	18	Ph. D. Ongoing = 04
4	Pato Kumari	Ph.D. (IIT (ISM) Dhanbad)	Associate Professor	Elastodynamics	14	Ph. D. Ongoing = 02
5	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Associate Professor	Computational Methods, Fuzzy optimization	19	Ph. D. Awarded= 01 Ongoing = 03
6	Yogesh Gupta	Ph.D. (MNNIT, Allahabad)	Associate Professor	Computational Mathematics	17	Ph. D. Awarded = 01 Ongoing = 02
7	Anuj Bhardwaj	Ph.D. (UPTU, Lucknow)	Assistant Professor	Numerical Methods, Wavelets	20	Ph. D. Ongoing = 02
8	Lakhveer Kaur	Ph.D. (Thapar University, Patiala)	Assistant Professor	Exact Solutions & Symmetries for Nonlinear Systems	10	Ph. D. Awarded = 01 Ongoing = 01
9	Dr. Richa Sharma	PhD (JIIT Noida)	Assistant Professor	Elastic-Plastic and creep stress analysis	13	Ph. D. Ongoing= NIL
10	Neha Ahlawat	Ph.D. (IIT Roorkee)	Assistant Professor	Vibration of Plates	04	Ph. D. Ongoing = 02
11	Mohd. Sarfaraz	Ph. D. (Aligarh Muslim University)	Assistant Professor	Variational Inequalities and Inclusions Problems	03	Ph. D. Ongoing= NIL

12	Dr. Nisha Shukla	PhD (JIIT Noida)	Assistant Professor	Computational Fluid Dynamics, Analytical Solutions, HAM, Numerical Solutions	03	Ph. D. Ongoing= NIL
13	Dr. Rajanish Kumar Rai*	PhD (BHU Varanasi)	Assistant Professor	Stability theory and Optimal Control	02	Ph. D. Ongoing= NIL

List of Publications: 15

In Journal

Sl. No	Title of the Paper	Name of Authors	Title of journal	Citation Index	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	On quasi-seismic wave propagation in highly anisotropic triclinic layer between distinct semi-infinite triclinic geomeadia	Kumari, P. and Neha	Applied Mathematical Modelling		Jaypee Institute of Information Technology, Noida	0
2	Numerical Analysis Approach for Models of Covid-19 and Other Epidemics	Ritu, Gupta, Y.	International Journal of Modeling, Simulation, and Scientific Computing		Jaypee Institute of Information Technology, Noida	1
3	LTNE magneto-thermal stability analysis on rough surfaces utilizing hybrid nanoparticles and heat source with artificial neural network prediction	Puneet Rana, Vishal Gupta and Lokendra Kumar	Applied Nanoscience		Jaypee Institute of Information Technology, Noida	
4	Image Authentication Using Block Truncation Coding in Lifting Wavelet Domain	Bhardwaj A., Verma V.S. and Gupta S.	International Journal of Image and Graphics		Jaypee Institute of Information Technology, Noida	0
5	Contrast enhancement of MRI images using morphological transforms and PSO	Wadhwa A., Bhardwaj A.	Multimedia Tools and Applications		Jaypee Institute of Information Technology, Noida	0

6	An Efficient Numerical Simulation of a Reaction-Diffusion Malaria Infection Model using B-splines Collocation	Mittal, R.C., Goel, R. and Ahlawat, N.	Chaos, Solitons & Fractals		Jaypee Institute of Information Technology, Noida	1
7	A cubic B-spline quasi-interpolation algorithm to capture the pattern formation of coupled reaction-diffusion models	Mittal, R.C., Kumar, S., Jiwari, R.	Engineering with Computer		Jaypee Institute of Information Technology, Noida	2
8	Some exact invariant solutions and dynamical structures of multiple solitons for the (2+1)-dimensional Bogoyavlensky-Konopelchenko equation with variable coefficients using Lie symmetry analysis	Kumar, S., Kaur, L., Niwas, M.	Chinese Journal of Physics		Jaypee Institute of Information Technology, Noida	1
9	Nonpolynomial twin parameter spline approach to treat boundary-value problems arising in engineering problems	Srivastava, P.K.	Computational and Applied Mathematics		Jaypee Institute of Information Technology, Noida	0
10	Analysis of chaotic behavior of three-dimensional dynamical systems by a - spline differential quadrature algorithm	Rohila , Rajni and Mittal, R. C. .	Asian-European Journal of Mathematics		Jaypee Institute of Information Technology, Noida	
11	Elastic-plastic axis-symmetrical bending of functionally graded rectangular wide plates	Richa Sharma, Varsha Singhal, Prani Sachan,	Structural Integrity and Life		Jaypee Institute of Information Technology, Noida	
12	Cu-Al ₂ O ₃ /engine oil Williamson hybrid nanofluid flow over a stretching/shrinking Riga plate with viscous dissipation and radiation effect	Nidhi, Lokendra Kumar	Heat Transfer		Jaypee Institute of Information Technology, Noida	0
13	1-Soliton solutions of the (2 + 1)-dimensional Heisenberg ferromagnetic spin chain model with the beta time derivative	Hosseini, K., Kaur, L., Mirzazadeh, M. et al	Optical and Quantum Electronics		Jaypee Institute of Information Technology, Noida	16
14	New Exact Solutions of the (4+1)-Dimensional Fokas Equation Via Extended Version of $\exp(-\psi(\kappa))$ -Expansion Method	Verma, P., Kaur, L.	International Journal of Applied and Computational Mathematics		Jaypee Institute of Information Technology, Noida	1

In Conference Proceeding

S. N.	Title of the Paper	Name of Authors	Name of the conference	Name of the Publisher	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Bilinearization and Analytic Solutions of $(2 + 1)$ -Dimensional Generalized Hirota-Satsuma-Ito Equation	Kaur L.	International Conference on Trends in Computational and Cognitive Engineering	Springer	Jaypee Institute of Information Technology, Noida	0

Event/Activity Organized:

S.N.	Speaker	Date	Topic
1	Prof. Natesan Srinivasan, IIT Guwahati	October 19, 2021	Moving Mesh Methods for Burger's and Navier-Stokes Equations

Sl.No.	Title of the Event/Activity	Teachers/ Lab staff	From date	To Date	Number of participants
01	Faculty Development Program on Recent Techniques for the Solutions of Nonlinear Differential Equations	19	Aug 23, 2021	Aug 28, 2021	83
02	Teacher's Enrichment Workshop (TEW) on "Differential Equations and Mathematical Modelling "	12	Feb 14, 2022	Feb 27, 2022	14

(c) Statistics, Fuzzy, Information Theory and Operations Research

In this age of information revolution, the role of statistics, fuzzy sets, information theory and operations research is of prime importance. The statistical data are not always precise numbers, or vectors, or categories. Real data are frequently what is called fuzzy. Also the results of measurements of such data can be best described by using fuzzy numbers and fuzzy vectors. Statistical analysis methods have to be adapted for the analysis of fuzzy data. Information theory deals with the study of problems concerning information processing, information storage, information retrieval and decision-making. This includes the study of uncertainty measures and various practical and economical methods of coding information for transmission. Operations research is required to deal with wide range of problem-solving techniques applied in the pursuit of

improved decision-making and efficiency, such as simulation, mathematical optimization, queueing theory and other stochastic-process models.

List of faculty members: 09

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.22	Research Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	26	Ph. D. Awarded=01 Ongoing = 04
2	Amit Srivastava	Ph.D. (MNIT Jaipur)	Associate Professor	Information & Coding Theory	21	Ph. D. Awarded = 01 Ongoing = 04
3	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Associate Professor	Computational Methods, Fuzzy optimization	19	Ph. D. Awarded= 01 Ongoing = 03
4	Dinesh C. Singh Bisht	Ph.D. (G.B.Pant University, Utrakhnad)	Associate Professor	Soft Computing	13	Ph. D. Awarded=01 Ongoing = 04
5	Himanshu Agarwal	Ph.D. (IIT Roorkee)	Assistant Professor	Image Processing	08	Ph. D. Ongoing = 03
6	Amita Bhagat	Ph.D. (IIT Roorkee)	Assistant Professor	Queueing Theory	07	Ph. D. Awarded = 01 Ongoing = 01
7	Pinkey Chauhan	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	06	Ph. D. Ongoing = 01
8	Neha Singhal	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	03	Ph. D. Ongoing= 01
9	Dr. Shruti*	PhD (BITS Pilani)	Assistant Professor	Applied Probability, Performance evaluation of Wireless Communication networks	01	Ph. D. Ongoing= NIL

List of Publications: 14

In Journal

Sl. No	Title of the Paper	Name of Authors	Title of journal	Citation Index	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Pareto-optimal solution for fixed-charge solid transportation problem under intuitionistic fuzzy environment	Chhibber, D., Bisht, D. C. S. and Srivastava, P. K.	Applied Soft Computing		Jaypee Institute of Information Technology, Noida	0
2	Strong α -cut and associated membership-based modeling for fuzzy time series forecasting	Goyal, G. and Bisht, D.C. S.	International Journal of Modeling, Simulation, and Scientific Computing		Jaypee Institute of Information Technology, Noida	0
3	Interplay between symmetry, convexity and negation of a probability distribution	Srivastava A. and Tanwar, P.	International Journal of Intelligent systems		Jaypee Institute of Information Technology, Noida	0
4	Controlled Arrival Machine Repair Problem with Working Vacation and Reattempts	Bhagat, A., Sethi, R., Garg, D	International Journal of Mathematical, Engineering and Management Sciences		Jaypee Institute of Information Technology, Noida	0
5	A new dynamic score function approach to optimize a special class of Pythagorean fuzzy transportation problem	Nagar, P., Srivastava, P.K. and Srivastava, A	International Journal of System Assurance Engineering and Management,		Jaypee Institute of Information Technology, Noida	0
6	From fuzzy transportation problem to non-linear intuitionistic fuzzy multi-objective transportation problem: A literature review	Chhibber, D., Srivastava, P.K. and Bisht, D.C S.	International Journal of Modelling and Simulation		Jaypee Institute of Information Technology, Noida	0
7	Optimization of Fuzzy Species Pythagorean Transportation Problem under Preserved Uncertainties	Nagar, P., Srivastava, P.K. and Srivastava, A	International Journal of Mathematical, Engineering and Management Sciences		Jaypee Institute of Information Technology, Noida	0
8	Adaptive neuro-fuzzy approach for prediction of global solar radiation for 25 cities falling under seven	Tikkiwal, Vinay Anand; Singh,	International Journal of Computer Aided		Jaypee Institute of Information Technology,	0

	Köppen climatic zones	SajaiVir; Bisht, Dinesh; Gupta, Hari Om;	Engineering and Technology		Noida	
9	A Hybrid Method for Multi-Criteria Group Decision Making under Pythagorean Fuzzy Environment	Singh, Yograj; Bisht, Dinesh CS	International Journal of Modelling and Simulation		Jaypee Institute of Information Technology, Noida	0
10	State Minimization of General Finite Fuzzy Automata	Kaur, R and Tripathi, A.	International Journal of Mathematical, Engineering and Management Science		Jaypee Institute of Information Technology, Noida	0
11	Gompertz PSO variants for Knapsack and Multi-Knapsack Problems	Chauhan, P., Pant, M., Deep, K.	Applied Mathematics-A Journal of Chinese Universities		Jaypee Institute of Information Technology, Noida	0

In Conference Proceeding

S. N.	Title of the Paper	Name of Authors	Name of the conference	Name of the Publisher	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citation
1	Real Coded Genetic Algorithm for Selecting Optimal Machining Conditions	Chauhan, P.	International Conference on Scientific and Natural Computing (SNC), 2021	Springer	Jaypee Institute of Information Technology, Noida	0
2	Image Solution of Stochastic Differential Equation of Diffusion Type Driven by Brownian Motion	Himanshu Agarwal	5th International Conference on Computer Vision and Image Processing, Allahabad, India, 2020	Springer	Jaypee Institute of Information Technology, Noida	0

Book/Book Chapter publications

S. N.	Title	Name of Authors	Title of the book/chapters published	Name of the Publisher	Institutional affiliation as mentioned in the publication	N/I
1	Recent Advances in Time series Forecasting	Dinesh C. S. Bisht, Mangey Ram	Recent Advances in Time series Forecasting	CRC Press	Jaypee Institute of Information Technology, Noida	I

Event/Activity Organized:

S.N.	Speaker	Date	Topic
1	Prof. Rajesh Sharma, MNIT Jaipur	December 27, 2021	Nature Inspired Algorithms
2	Dr. Sanjeev Kumar Malik, IIT Roorkee	May 17, 2022	Understanding Machine Learning with Linear Algebra and Optimization Perspectives

Research Thrust Areas/Groups

2019-20

Research thrust areas as recognized by major funding agencies

- (b) Fractals & Chaos and Mathematical Analysis
- (b) Numerical Analysis and Computational Continuum Mechanics
- (c) Statistics, Fuzzy, Information Theory and Operations Research

(a) Fractals & Chaos and Mathematical Analysis

Fractals and chaos are new frontiers of science and important emerging interdisciplinary areas of research nowadays. Wavelets and fractals have significant contributions in the fields of image and signal processing, image compression, data compression and other various approximations. Almost all branches of sciences and engineering are benefiting from the new insights provided by them. Many shapes found in nature which are highly rough and complex at different scales, fractal interpolation methods are popularly accepted approximation tools in such cases. Mathematical

analysis provides the foundation for further development in these areas. The applications of explorations in these areas encompasses various disciplines of sciences, engineering, medicine, business, weather forecasting and several other areas of human activities.

Group Coordinator: Prof. B P Chamola

List of faculty members: 05

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.20	Research Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	24	Ph. D. Awarded=03 Ongoing = 02
2	B P Chamola	Ph.D. (Gurukul Kangri, Hardwar)	Professor	Fixed Point Theory and Fractals	28	Ph. D. Awarded=04 Ongoing = 02
3	Trapti Neer	Ph.D. (IIT Roorkee)	Assistant Professor	Approximation Theory	02	Ph. D. Ongoing= NIL
4	Priyanka Sangal	Ph.D. (IIT Roorkee)	Assistant Professor	Complex Analysis	01	Ph. D. Ongoing= NIL
5	Sheetal Deshwal	Ph.D. (IIT Roorkee)	Assistant Professor	Approximation Theory	01	Ph. D. Ongoing= NIL

List of Publications: 05

1.	Bhagwati Prasad, Kunti Mishra, A novel encryption compression scheme using Julia sets, International Journal of Advanced Intelligence Paradigms, 13, 1/2, 8-14, 2019.	
	Indexing	Scopus
	JCR Impact Factor	0
	SJR	0.15
	SNIP	0
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	17550386
	Website link:	https://www.inderscience.com/info/inarticle.php?artid=99940

2.	Trapti Neer, A.M. Acu, P. N. Agrawal, Baskakov-Durrmeyer type operators involving generalized Appell Polynomials, Mathematical Methods in the Applied Sciences, 43, 6, 2911-2923, 2020.	
	Indexing	Scopus, SCIE

JCR Impact Factor	1.626
SJR	0.667
SNIP	1.02
Peer Reviewed	Yes
Google Scholar Citation	0
ISSN	1099-1476
Website link:	https://onlinelibrary.wiley.com/doi/abs/10.1002/mma.6089

3.	Kuldip Katiyar, Bhagwati Prasad, Visualizing Data Set Using Bivariate Trigonometric Functions, AIP Conf. Proc. , 2061, 1, 020037-1–020037-13, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.194
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/doi/abs/10.1063/1.5086659

4.	Tripathi, A. And Kaur R., "A review of state minimization and state reduction techniques in fuzzy automata" AIP Conference Proceedings, vol. 2061, pp. 020033, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

5.	Tripathi, A. And Tyagi K., "Rough Fuzzy (final)Automata" AIP Conference Proceedings, vol. 2061, pp. 020019, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes

Google Scholar Citation	0
ISSN	0094-243X
Website link:	https://aip.scitation.org/toc/apc/2061/1

Event/Activity Organized:

S. No.	Conference/FDP/Workshop	Date
1.	Mini Symposium on Analytic Number Theory and its Application in Cryptography/computing: A Tribute to S. Ramanujan	August 31-September 1, 2019
2.	4th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2020)	January 09-11, 2020

(b) Numerical Analysis and Computational Continuum Mechanics

The numerical solution of the problems occurring in Computational Continuum Mechanics is of great practical importance. The governing simultaneous ordinary and partial differential equations remain highly nonlinear and therefore, cannot be solved analytically. These equations can be solved numerically by using numerical methods such as finite element, finite difference, quasi-linearization, mesh free methods.

Group Coordinator: Prof. R. C. Mittal

List of faculty members: 12

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years	Research Guidance (Last 4 years)
1	R. C. Mittal	Ph.D. (IIT Delhi)	Professor	Numerical Solutions of PDE	41	Ph. D. Ongoing = 02
2	A K Aggarwal	Ph.D. (HP University, Shimla)	Professor	Hydrodynamic Stability	28	Ph. D. Awarded=04 Ongoing = 03
3	Sanjeev Sharma	Ph.D. (HP University, Shimla)	Associate Professor	Computational Continuum Mechanics	21	Ph. D. Ongoing = 03
4	Lokendra Kumar	Ph.D. (IIT Roorkee)	Associate Professor	Computational Fluid Dynamics	16	Ph. D. Awarded = 02 Ongoing = 04
5	Pato Kumari	Ph.D. (IIT (ISM) Dhanbad)	Assistant Professor	Elastodynamics	12	Ph. D. Awarded=01 Ongoing = 01

6	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Assistant Professor	Computational Methods, Fuzzy optimization	17	Ph. D. Ongoing = 03
7	Anuj Bhardwaj	Ph.D. (UPTU, Lucknow)	Assistant Professor	Numerical Methods, Wavelets	18	Ph. D. Ongoing = 02
8	Yogesh Gupta	Ph.D. (MNNIT, Allahabad)	Assistant Professor	Computational Mathematics	15	Ph. D. Ongoing = 02
9	Puneet Rana	Ph.D. (IIT Roorkee)	Assistant Professor	Computational Fluid dynamics	07	Ph. D. Awarded=02 Ongoing = 02
10	Lakhveer Kaur	Ph.D. (Thapar University, Patiala)	Assistant Professor	Exact Solutions & Symmetries for Nonlinear Systems	08	Ph. D. Ongoing = 02
11	Neha Ahlawat	Ph.D. (IIT Roorkee)	Assistant Professor	Vibration of Plates	03	Ph. D. Ongoing= 01
12	Mohd. Sarfaraz	Ph. D. (Aligarh Muslim University)	Assistant Professor	Variational Inequalities and Inclusions Problems	01	Ph. D. Ongoing= NIL

List of Publications: 39

1.	Geeta Arora, Varun Joshi, R. C. Mittal, Numerical Simulation of Nonlinear Schrödinger Equation in One and Two Dimensions, Mathematical Models and Computer Simulations, 11, 4, 634-648, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.42
	SNIP	1.285
	Peer Reviewed	Yes
	Google Scholar Citation	3
	ISSN	2070-0482
	Website link:	https://link.springer.com/article/10.1134/S2070048219040070
2.	Pankaj Kumar Srivastava, A spline-based computational technique applicable for solution of boundary value problem arising in human physiology, International Journal of Computing Science and Mathematics, 10, 1, 46-57, 2019.	
	Indexing	Scopus, ESCI
	JCR Impact	0

	Factor	
	SJR	0.148
	SNIP	0.495
	Peer Reviewed	Yes
	Google Scholar Citation	1
	ISSN	1752-5055
	Website link:	https://www.inderscienceonline.com/doi/pdf/10.1504/IJCSM.2019.097635

3.	Anjali Wadhwa, Anuj Bhardwaj, Vivek Singh Verma, A review on brain tumor segmentation of MRI images, Magnetic Resonance Imaging, 61, , 247–259, 2019,	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.053
	SJR	0.792
	SNIP	0.896
	Peer Reviewed	Yes
	Google Scholar Citation	15
	ISSN	0730-725X
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S0730725X19300347

4.	Vijeyata Chauhan and Pankaj Kumar Srivastava, A numeric three stage trio-geometric mean Runge-Kutta approach over Verhulst equation on population dynamics, Nonlinear Studies, 26, 2, 379-389, 2019.	
	Indexing	Scopus
	JCR Impact Factor	0
	SJR	0.227
	SNIP	0.456
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	1359-8678
	Website link:	http://www.nonlinearstudies.com/index.php/nonlinear/article/view/1958

5.	Puneet Rana, Nisha Shukla, Yogesh Gupta and Ioan Pop, Homotopy analysis method for predicting multiple solutions in the channel flow with stability analysis, Communications in Nonlinear Science and Numerical Simulation, 66, 183-193, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	4.115
	SJR	1.299
	SNIP	1.863
	Peer Reviewed	Yes
	Google Scholar Citation	25

ISSN	1007-5704
Website link:	https://www.sciencedirect.com/science/article/abs/pii/S1007570418301898

6.	Puneet Rana, Nisha Shukla, Yogesh Gupta and Ioan Pop, Analytical prediction of multiple solutions for MHD Jeffery-Hamel flow and heat transfer utilizing KKL nanofluid model, Physics Letters A, 383, 176-185, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.278
	SJR	0.513
	SNIP	0.864
	Peer Reviewed	Yes
	Google Scholar Citation	13
	ISSN	0375-9601
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S0375960118310867

73.	Anju Chaurasia, P. C. Srivastava, Yogesh Gupta and Anuj Bhardwaj, Composite non-polynomial spline solution of boundary value problems in plate deflection theory, International Journal for Computational Methods in Engineering Science and Mechanics, 20, 371-379, 2019.	
	Indexing	Scopus
	JCR Impact Factor	0
	SJR	0.243
	SNIP	0.447
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	1550-2287
	Website link:	https://www.tandfonline.com/doi/abs/10.1080/15502287.2019.1650311

8.	Pato Kumari and Vikash Kumar Sharma, Dynamics of seismic waves in highly anisotropic triclinic media with intermediate monoclinic layer, Applied Mathematical Modelling, 71, 375-393, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	3.633
	SJR	0.957
	SNIP	1.752
	Peer Reviewed	Yes
	Google Scholar Citation	6
	ISSN	0307904X
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S0307904X19301143

9.	Vivek Singh Verma, Anuj Bhardwaj and Rajib Kumar Jha, A new scheme for watermark extraction using combined noise-induced resonance and support vector machine with PCA based feature reduction, <i>Multimedia Tools and Applications</i> , 78, 16, 23203–23224, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.313
	SJR	0.462
	SNIP	1.156
	Peer Reviewed	Yes
	Google Scholar Citation	3
	ISSN	1380-7501
	Website link:	https://doi.org/10.1007/s11042-019-7599-z

10.	Puneet Rana, Shilpi Agarwal, Anuj Bhardwaj, Triple diffusive convection study of a binary nanofluid saturated rotating porous layer under the influence of magnetic field, <i>International Journal for Computational Methods in Engineering Science and Mechanics</i> , 20, 5, 395-403, 2019.	
	Indexing	Scopus, ESCI
	JCR Impact Factor	0
	SJR	0.243
	SNIP	0.447
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	1550-2287
	Website link:	https://doi.org/10.1080/15502287.2019.1650312

11.	Pallavi Verma, Lakhveer kaur, Solitary Wave Solutions for (1+2)-Dimensional Nonlinear Schrödinger Equation with Dual Power Law Nonlinearity, <i>International Journal of Applied and Computational Mathematics</i> , 5, 5, 128, 2019.	
	Indexing	Scopus
	JCR Impact Factor	0
	SJR	0.232
	SNIP	0.634
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	2199-5796
	Website link:	https://link.springer.com/article/10.1007/s40819-019-0711-2

12.	Lakhveer Kaur, Abdul Majid Wazwaz, Bright-dark lump wave solutions for a new form of the (3+1)-dimensional BKP-Boussinesq equation, <i>Romanian Reports in Physics</i> , 71, 102, 1, 2019.	
	Indexing	Scopus, SCIE

	JCR Impact Factor	1.94
	SJR	0.502
	SNIP	0.646
	Peer Reviewed	Yes
	Google Scholar Citation	20
	ISSN	1841-8759
	Website link:	http://www.rrp.infim.ro/2019/AN71102.pdf

13.	Lakhveer Kaur, Abdul Majid Wazwaz, Bright–dark optical solitons for Schrodinger-Hirota equation with variable coefficients, Optik, 179, , 479, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.187
	SJR	0.475
	SNIP	0.896
	Peer Reviewed	Yes
	Google Scholar Citation	11
	ISSN	0030-4026
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S003040261831338X

14.	Abdul Majid Wazwaz, Lakhveer Kaur, Optical solitons and Peregrine solitons for nonlinear Schrödinger equation by variational iteration method, Optik, 179, , 804, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.187
	SJR	0.475
	SNIP	0.896
	Peer Reviewed	Yes
	Google Scholar Citation	8
	ISSN	0030-4026
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S0030402618317480

15.	Lakhveer Kaur, Abdul Majid Wazwaz, Optical solitons for nonlinear Schrödinger (NLS) equation in normal dispersive regimes, Optik, 184, , 428, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.187
	SJR	0.475
	SNIP	0.896

	Peer Reviewed	Yes
	Google Scholar Citation	14
	ISSN	0030-4026
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S0030402619305960

16.	Pallavi Verma, Lakhveer Kaur, Painlevé integrability, bilinearization and exact solutions of the new (3+ 1)-dimensional generalized Kadomstev-Petviashvili equation, <i>Nonlinear Studies</i> , 26, 2, 279-287, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.23
	SNIP	0.456
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	1359-8678
	Website link:	http://nonlinearstudies.com/index.php/nonlinear/article/view/1951

17.	Pallavi Verma, Lakhveer Kaur, Integrability, bilinearization and analytic study of new form of (3+ 1)-dimensional B-type Kadomstev–Petviashvili (BKP)-Boussinesq equation, <i>Applied Mathematics and Computation</i> , 346, , 879-886, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	3.472
	SJR	0.969
	SNIP	1.766
	Peer Reviewed	Yes
	Google Scholar Citation	9
	ISSN	0096-3003
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S0096300318310245

18.	Abdul Majid Wazwaz, Lakhveer Kaur, Complex simplified Hirota’s forms and Lie symmetry analysis for multiple real and complex soliton solutions of the modified KdV–Sine-Gordon equation, <i>Nonlinear Dynamics</i> , 95, , 2209-2215, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	4.54
	SJR	1.394
	SNIP	1.728
	Peer Reviewed	Yes
	Google Scholar Citation	15

ISSN	1573-269X
Website link:	https://link.springer.com/article/10.1007/s11071-018-4686-z

19.	Lakhveer Kaur, Abdul Majid Wazwaz, Lump, breather and solitary wave solutions to new reduced form of the generalized BKP equation, International Journal of Numerical Methods for Heat & Fluid Flow, 29, 2, 569-579, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	2.533
	SJR	0.508
	SNIP	1.27
	Peer Reviewed	Yes
	Google Scholar Citation	11
	ISSN	0961-5539
	Website link:	https://www.emerald.com/insight/content/doi/10.1108/HFF-07-2018-0405/full/html

20.	Lakhveer Kaur, Abdul Majid Wazwaz, Einstein's vacuum field equation: Painlevé analysis and Lie symmetries, Waves in Random and Complex Media, 2019, 1-8, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	3.223
	SJR	0.624
	SNIP	0.897
	Peer Reviewed	Yes
	Google Scholar Citation	2
	ISSN	1745-5049
	Website link:	https://www.tandfonline.com/doi/abs/10.1080/17455030.2019.1574410

21.	Abdul Majid Wazwaz, Lakhveer Kaur, New integrable Boussinesq equations of distinct dimensions with diverse variety of soliton solutions, Nonlinear Dynamics, 97, 1, 83-94, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	4.867
	SJR	1.394
	SNIP	1.728
	Peer Reviewed	Yes
	Google Scholar Citation	14
	ISSN	1573-269X
	Website link:	https://link.springer.com/content/pdf/10.1007/s11071-019-04955-1.pdf

22.	A. K. Aggarwal and Dhruva Dixit, Triple Diffusive Convection of Non-Newtonian Fluid Under the Combined Effect of Compressibility and Variable Gravity, Int. J. of Applied Mechanics and Engineering, 24, 4, 1-11, 2019.	
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	Indexing	Scopus
	JCR Impact Factor	0.9
	SJR	0.207
	SNIP	0.6
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	2353-9003
	Website link:	https://content.sciendo.com/view/journals/ijame/24/4/article-p1.xml?language=en

23.	Sharma S. and Yadav S. (2019), “Numerical solution of thermal elastic-plastic functionally graded thin rotating disk with exponentially variable thickness and variable density”, <i>Thermal Science</i> , vol. 23 no. 1, pp. 125-136.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	1.574
	SJR	0.495
	SNIP	0.667
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0354-9836
	Website link:	http://www.doiserbia.nb.rs/Article.aspx?id=0354-98361800136S#.Xzjtj8AzbIU

24.	Sharma S., Maheshwari K. (2019), “Elastic-plastic transition in functionally graded thin rotating orthotropic disk with variable thickness and density”, <i>Structural Integrity and Life</i> , vol 19 no. 3, pp. 157-165.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.244
	SNIP	0.559
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	1451-3749
	Website link:	http://divk.inovacionicentar.rs/ivk/ivk19/ivk1903-2.html

25.	Verma, D., Agarwal, H. and Aggarwal, A. K. “Recognition of Degraded and Non Degraded Roman Characters Using Different Classifiers”, <i>Universal Journal of Electrical and Electronic Engineering</i> , vol.6, no. 5, pp. 402-419, 2019.	
	Indexing	Scopus
	JCR Impact	NIL

	Factor	
	SJR	0.106
	SNIP	0.156
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	2332-3280
	Website link:	http://www.hrpub.org/journals/article_info.php?aid=8732

26.	Verma,D., Agarwal, H. and Aggarwal, A.K. “3D motion trajectories recognition using optimal set of geometric primitives, angular and statistical features”, <i>International Journal of Innovative Technology and Exploring Engineering</i> , vol. 9, no.2, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.102
	SNIP	0.055
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	2278-3075
	Website link:	https://www.ijitee.org/wp-content/uploads/papers/v9i2/B7594129219.pdf

27.	Verma, D., Agarwal, H. and Aggarwal, A. K. “Recognition of roman characters using geometric and regional features”, <i>International Journal of Recent Technology and Engineering</i> , vol. 8, no. 3, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.107
	SNIP	0.012
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	2277-3878
	Website link:	https://www.ijrte.org/wp-content/uploads/papers/v8i3/C5878098319.pdf

28.	Kumari P., Neha "Dynamics of quasi-seismic wave in an isotropic layer between monoclinic materials overburden by self-reinforced crustal zone", <i>Waves in Random and Complex Media</i> , doi.org/10.1080/17455030.2019.1676935, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	3.223

	SJR	0.624
	SNIP	0.897
	Peer Reviewed	Yes
	Google Scholar Citation	2
	ISSN	1745-5049
	Website link:	https://www.tandfonline.com/doi/abs/10.1080/17455030.2019.1676935

29.	S Kumar, PK Sharma, P Rana, Critical values in transport phenomena for curved power-law sheet utilizing Al ₂ O ₃ -Cu/water hybrid nanoliquid: Model prediction and stability analysis, Advanced Powder Technology, Vol. 30 (11), pp. 2787-2800, 2019.	
	Indexing	Scopus, SCIE
	JCR Impact Factor	4.217
	SJR	0.802
	SNIP	1.432
	Peer Reviewed	Yes
	Google Scholar Citation	5
	ISSN	0921-8831
	Website link:	https://www.sciencedirect.com/science/article/abs/pii/S092188311930295X

30.	N. Shukla, P. Rana, O. A. Bég, B. Singh, A. Kadir, Homotopy study of magnetohydrodynamic mixed convection nanofluid multiple slip flow and heat transfer from a vertical cylinder with entropy generation, Propulsion and Power Research, Vol. 8, pp. 147-162, 2019	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.507
	SNIP	1.274
	Peer Reviewed	Yes
	Google Scholar Citation	8
	ISSN	2212-540X
	Website link:	https://www.sciencedirect.com/science/article/pii/S2212540X19300057

31.	N. Shukla, P. Rana, O. A. Bég, Unsteady MHD Non-Newtonian Heat Transfer Nanofluids with Entropy Generation Analysis, Nonlinear Engineering, Vol. 8 (1), pp. 630-644, 2019	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.27
	SNIP	0.757
	Peer Reviewed	Yes
	Google Scholar Citation	4
	ISSN	2192-8010

Website link:	https://www.degruyter.com/view/journals/nleng/8/1/article-p630.xml
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32.	Pallavi Verma, Lakhveer kaur, A Class of Soliton Solutions of Whitham-Broer-Kaup Equations by Means of Generalized-Expansion Method, AIP Conference Proceedings, 2061, 1, 20003, 2019.	
	Indexing	Scopus
	JCR Impact Factor	0
	SJR	0.194
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	1
	ISSN	0094243X
	Website link:	https://doi.org/10.1063/1.5086625

33.	N Shukla, P Rana, Unsteady EMHD stagnation flow of a second grade nanofluid over a stretching sheet: HAM solutions, AIP Conference Proceedings, 2061 (1), 020021, 2019	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

34.	G. Verma, P. Thakur, P. Rana, Elastic-plastic analysis of transversely isotropic spherical shell under internal pressure, AIP Conference Proceedings 2061 (1), 020031, 2019	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

35.	Ahlawat, N. "Numerical solution for buckling and vibration of bi-directional FGM circular plates." In AIP Conference Proceedings, vol. 2061, no. 1, p. 020020. AIP Publishing, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

36.	S. Saxena, V. Sharma, V.S. Verma, A. Bhardwaj, "Robust digital image watermarking Scheme based on discrete fractional fourier transform", AIP Conference Proceedings 2061 (1), 020034, 2019.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

37.	Kumari P., Tripathi S., Sharma V. K., "A review of Indian seismic zones based on historical earthquake data using geographical information system", AIP Conference Proceedings, vol. 2061 (1), pp. 020038.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

38.	Kumari P., "Scattering of quasi-longitudinal/transverse seismic wave in the monoclinic strip between different monoclinic half-spaces", AIP Conference Proceedings, vol. 2061 (1), pp.	
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	020039.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

39.	Sharma S., Maheshwari K. (2019), Creep Stresses in Functionally Graded thin rotating Orthotropic Disk with Variable Thickness and Density, Advancement in Mathematical Sciences, American Institute of Physics, 2061, 020036-1-020036-7.	
	Indexing	Scopus
	JCR Impact Factor	NIL
	SJR	0.19
	SNIP	0.373
	Peer Reviewed	Yes
	Google Scholar Citation	0
	ISSN	0094-243X
	Website link:	https://aip.scitation.org/toc/apc/2061/1

Event/Activity Organized: Nil

(c) Statistics, Fuzzy, Information Theory and Operations Research

In this age of information revolution, the role of statistics, fuzzy sets, information theory and operations research are of prime importance. The statistical data are not always precise numbers, or vectors, or categories. Real data are frequently what is called fuzzy. Also, the results of measurements of such data can be best described by using fuzzy numbers and fuzzy vectors. Statistical analysis methods have to be adapted for the analysis of fuzzy data. Information theory deals with the study of problems concerning information processing, information storage, information retrieval and decision-making. This includes the study of uncertainty measures and various practical and economical methods of coding information for transmission. Operations research is required to deal with wide range of problem-solving techniques applied in the pursuit of

improved decision-making and efficiency, such as simulation, mathematical optimization, queueing theory and other stochastic-process models.

Group Coordinator: Dr. Amit Srivastava

List of faculty members: 8

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.20	Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	24	Ph. D. Awarded=03 Ongoing = 02
2	Amit Srivastava	Ph.D. (MNIT Jaipur)	Associate Professor	Information & Coding Theory	20	Ph. D. Awarded = 01 Ongoing = 03
3	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Assistant Professor	Computational Methods, Fuzzy optimization	17	Ph. D. Ongoing = 03
4	Dinesh C. Singh Bisht	Ph.D. (G.B.Pant University, Utrakhand)	Assistant Professor	Soft Computing	12	Ph. D. Awarded=01 Ongoing = 03
5	Himanshu Agarwal	Ph.D. (IIT Roorkee)	Assistant Professor	Image Processing	06	Ph. D. Ongoing = 03
6	Amita Bhagat	Ph.D. (IIT Roorkee)	Assistant Professor	Queueing Theory	06	Ph. D. Ongoing = 02
7	Pinkey Chauhan	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	03	Ph. D. Ongoing= 01
8	Neha Singhal	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	02	Ph. D. Ongoing= NIL

List of Publications 25

1. Srivastava, P. K. and Bisht, D. C. S., "An efficient fuzzy minimum demand supply approach to solve fully fuzzy transportation problem", *Mathematics in Engineering, Science and Aerospace*, 10(2), (2019), 253-269.
2. A. Wadhwa, A. Bhardwaj, V.S. Verma, "A review on brain tumor segmentation of MRI images", *Magnetic Resonance Imaging*, vol. 61, pp. 247-259, 2019.

3. V. S. Verma, A. Bhardwaj, R.K. Jha , “A new scheme for watermark extraction using combined noise-induced resonance and support vector machine with PCA based feature reduction”, *Multimedia Tools and Applications*, vol. 78, no. 16, pp. 23203–23224, 2019.
4. Rachita Sethi, Amita Bhagat, Deepika Garg, ANFIS based Machine Repair Model with Control Policies and Working Vacation, *International Journal of Mathematical, Engineering and Management Science*, Vol. 4, No. 6, pp. 1522-1533, 2019.
5. Mathur N., Srivastava, P. K., "An Inventive Approach to Optimize Fuzzy Transportation Problem", *International Journal of Mathematical, Engineering and Management Sciences*, vol. 5(5), pp. 985–994, 2020.
6. G. Goyal and D. C. S. Bisht, “Fuzzy time series forecast with enhanced trends and weighted defuzzification”, *Mathematics in Engineering, Science & Aerospace* Vol. 11. No. 1, pp.91-102, 2020.
7. G. Goyal and D. C. S. Bisht, “Sugeno Intuitionistic Fuzzy Generator Based Computational Technique for Crude Oil Price Forecasting”, *International Journal of Mathematical, Engineering and Management Sciences*, Vol. 5, no. 3, pp. 488–496, 2020
8. D. C. S. Bisht and Pankaj Kumar Srivastava, “Trisectional fuzzy trapezoidal approach to optimize interval data-based transportation problem”, *Journal of King Saud University-Science*, vol.32, no. 1, pp. 195-199 ,2020.
9. A. Wadhwa, A. Bhardwaj, “Enhancement of MRI images of brain tumor using Grünwald Letnikov fractional differential mask”, *Multimedia Tools and Applications*, vol. 79, pp. 25379-25402, 2020.
10. Bhagat, A., Jain, M. “Retrial queue with multiple repairs, multiple services and non preemptive priority”. *OPSEARCH* 57, 787–814, 2020.
11. Srivastava, P. K., Bisht D. C. S. and Garg H., “Innovative Ranking and Conversion Approaches to Handle Impreciseness in Transportation”, *Journal of Multiple-Valued Logic & Soft Computing*, Vol. 35, Issue 5/6, pp. 491-507, 2020.
12. Srivastava, P.K. and Bisht, D.C. S., “A Segregated Advancement in the Solution of Triangular Fuzzy Transportation Problems", *American Journal of Mathematical and Management Sciences*, vol. 40, pp.1-11 2020.
13. Kusum Grewal Dangi, Amita Bhagat, Supriya P Panda, “Emergency Vital Data Packet Transmission in Hospital Centered Wireless Body Area Network”, *Procedia Computer Science, Elsevier*, Volume 171, 2020, pp. 2563-2571, 2020.
14. D. Chhibber, D.C.S. Bisht, and P. K. Srivastava, “Fuzzy transportation problems and variants” in *Computational Intelligence: Theoretical Advances and Advanced Applications*, *Walter de Gruyter GmbH & Co KG*, vol 3, pp.91-110, 2020.
15. V. Khanna, B. K. Das, and D. Bisht, “Particle swarm optimization and differential evolution algorithms: application to solar photovoltaic cells” in *Theoretical Advances and Advanced Applications*, *Walter de Gruyter GmbH & Co KG*, vol 3, pp.209-230, 2020.
16. G. Goyal, P. K. Srivastava, and D. C. S. Bisht, “Genetic algorithm: a metaheuristic approach of optimization” in *Computational Intelligence: Theoretical Advances and Advanced Applications*, *Walter de Gruyter GmbH & Co KG*, Vol 3, pp.27-44, 2020.

17. D. C. S. Bisht and M. Ram, *Computational Intelligence: Theoretical Advances and Advanced Applications*. Walter de Gruyter GmbH & Co KG, 2020, ISBN: 978-3-11-065524-7, ISSN 2626-5427.
18. Singhal N. and Sharma S.P., "Behavior Analysis of Polytube Industry Using Fuzzy Set Theory and Particle Swarm Optimization" in *Reliability and Risk Modeling of Engineering Systems. EAI/Springer Innovations in Communication and Computing*, pp 1-10, 2021.
19. B. P. Chamola and P. Kumari, *Advancements in Mathematics and its Emerging Areas*. AIP Publishing, USA, 2020, ISBN: 978-0-7354-1967-4.
20. Sethi R. and Bhagat A. (2019), "Performance analysis of machine repair problem with working vacation and service interruptions", *AIP Conference Proceedings*, vol. 2061, pp. 020028-1–020028-8, 2019.
21. P. Tanwar and A. Srivastava, "Knowledge and uncertainty in Atanassov's intuitionistic fuzzy sets (AIFSs)," in *Proc. 5th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2021)*, Noida, India, AIP Conference Proceedings 2214, 020005 (2020); <https://doi.org/10.1063/5.0003374>.
22. A. Bhardwaj, A. Wadhwa, "Medical image enhancement using fractional derivatives", In *AIP Conference Proceedings*, 2214 (1), 020009, 2020.
23. S Tyagi, S Malhotra, D Kumar, VS Verma, A. Bhardwaj, "Mammographic image segmentation with modified FCM based clustering algorithm", *AIP Conference Proceedings*, 2214 (1), 020028, 2020.
24. A. Bhagat, "Unreliable priority retrial queues with double orbits and discouraged customers", *AIP Conference Proceedings*, Vol. 2214, pp. 020014 2020.
25. K.G. Dangi, A. Bhagat and S. P. Panda, "Coexistence modeling of Wi-Fi and ZigBee in hospital centered wireless body area network", *AIP Conference Proceedings*, Vol. 2214, pp. 020004, 2020.

Events organized

S.No.	Events Organized	Date
1.	Faculty Development Programme on Optimization Techniques and Its Applications	July 01-06, 2019
2.	Mini Symposium on Analytic Number Theory and its Applications in Cryptography/Computing: A tribute to S. Ramanujan	August 31 – September 1, 2019

Research Thrust Areas/Groups

2018-19

Research thrust areas as recognized by major funding agencies

- (c) Fractals & Chaos and Mathematical Analysis
- (b) Numerical Analysis and Computational Continuum Mechanics
- (c) Statistics, Fuzzy, Information Theory and Operations Research
- (a) Fractals & Chaos and Mathematical Analysis**

Fractals and chaos are new frontiers of science and important emerging interdisciplinary areas of research nowadays. Wavelets and fractals have significant contributions in the fields of image and signal processing, image compression, data compression and other various approximations. Almost all branches of sciences and engineering are benefiting from the new insights provided by them. Many shapes found in nature which are highly rough and complex at different scales, fractal interpolation methods are popularly accepted approximation tools in such cases. Mathematical analysis provides the foundation for further development in these areas. The applications of explorations in these areas encompasses various disciplines of sciences, engineering, medicine, business, weather forecasting and several other areas of human activities.

Group Coordinator: Prof. B P Chamola

List of faculty members: 04

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.19	Research Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	23	Ph. D. Awarded=01 Ongoing = 02
2	B P Chamola	Ph.D. (Gurukul Kangri, Hardwar)	Professor	Fixed Point Theory and Fractals	27	Ph. D. Awarded=01 Ongoing = 01
3	Priyanka Sangal	Ph.D. (IIT Roorkee)	Assistant Professor	Complex Analysis	01	Ph. D. Ongoing= NIL
4	Sheetal Deshwal	Ph.D. (IIT Roorkee)	Assistant Professor	Approximation Theory	01	Ph. D. Ongoing= NIL

List of Publications: NIL

Event/Activity Organized:

1. Expert talk on the topic “*Paranormed generalizations of L^p spaces*” delivered by Prof. Janusz Matkowski, Faculty of Mathematics, Computer Science and Econometrics Zielona GŰra University, Zielona GŰra, Poland, 07 March 2018.
2. Expert talk on the topic “*Fractal, Chaos - Mathematical Modeling*” delivered by Prof. Rashmi Bhardwaj, University School of Basic & Applied Sciences, Guru Gobind Singh Indraprastha University (GGSIPU), New Delhi, India, July 31, 2018.

(b) Numerical Analysis and Computational Continuum Mechanics

The numerical solution of the problems occurring in Computational Continuum Mechanics is of great practical importance. The governing simultaneous ordinary and partial differential equations remain highly nonlinear and therefore, cannot be solved analytically. These equations can be solved numerically by using numerical methods such as finite element, finite difference, quasi-linearization, mesh free methods.

Group Coordinator: Prof. R. C. Mittal

List of faculty members: 13

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years	Research Guidance (Last 4 years)
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1	R. C. Mittal	Ph.D. (IIT Delhi)	Professor	Numerical Solutions of PDE	40	Ph. D. Ongoing = 01
2	A K Aggarwal	Ph.D. (HP University, Shimla)	Professor	Hydrodynamic Stability	27	Ph. D. Ongoing = 03
3	Sanjeev Sharma	Ph.D. (HP University, Shimla)	Associate Professor	Computational Continuum Mechanics	20	Ph. D. Ongoing = 02
4	Lokendra Kumar	Ph.D. (IIT Roorkee)	Associate Professor	Computational Fluid Dynamics	15	Ph. D. Ongoing = 02
5	Pato Kumari	Ph.D. (IIT (ISM) Dhanbad)	Assistant Professor	Elastodynamics	11	Ph. D. Ongoing = 01
6	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Assistant Professor	Computational Methods, Fuzzy optimization	16	Ph. D. Ongoing = 04
7	Anuj Bhardwaj	Ph.D. (UPTU, Lucknow)	Assistant Professor	Numerical Methods, Wavelets	17	Ph. D. Ongoing = 02
8	Yogesh Gupta	Ph.D. (MNNIT, Allahabad)	Assistant Professor	Computational Mathematics	14	Ph. D. Ongoing = 01
9	Puneet Rana	Ph.D. (IIT Roorkee)	Assistant Professor	Computational Fluid dynamics	06	Ph. D. Awarded=01 Ongoing = 01
10	Lakhveer Kaur	Ph.D. (Thapar University, Patiala)	Assistant Professor	Exact Solutions & Symmetries for Nonlinear Systems	07	Ph. D. Ongoing = 02
11	Neha Ahlawat	Ph.D. (IIT Roorkee)	Assistant Professor	Vibration of Plates	01	Ph. D. Ongoing= NIL
12	Sudhakar Chaudhary*	Ph.D. (IIT Delhi)	Assistant Professor	Partial Differential Equations	04	Ph. D. Ongoing= NIL
13	Anuj Kumar*	Ph.D. (IIT Patna)	Assistant Professor	Mathematical Modeling	01	Ph. D. Ongoing= NIL

List of Publications: 23

1. **Aggarwal, A. K.** and Dixit, D. "Effect of Suspended Particles on Thermosolutal Convection of Rivlin-Ericksen Fluid in Porous Medium with Variable Gravity", *Int. J. of Applied Mechanics and Engineering*, vol.23, No.3, pp.813-820, 2018.

JCR Impact Factor : NIL
SJR : 0.163
SNIP : 0.439
H-index(Journal) : 5

Indexed in(Scopus/SCI/SCIE/others): Scopus

Peer Reviewed(Yes/No) : Yes

Google Scholar Citation : NIL

ISSN : 2353-9003

Website link :

<https://content.sciendo.com/abstract/journals/ijame/23/3/article-p813.xml>

2. **Bhardwaj, Anuj**, Verma, Vivek Singh and Jha, Rajib Kumar, “Robust video watermarking using significant frame selection based on coefficient difference of lifting wavelet transform”, *Multimedia Tools and Applications*, vol. 77, pp. 19659-19678, 2018.

JCR Impact Factor : 2.101

SJR : 0.335

SNIP : 1.038

H-index(Journal) : 52

Indexed in(Scopus/SCI/SCIE/others): Scopus, SCIE

Peer Reviewed(Yes/No) : Yes

Google Scholar Citation : 9

ISSN : 1380-7501

Website link : <https://link.springer.com/article/10.1007/s11042-017-5340-3>

3. Wazwaz A. M. and **Kaur L.**, “A new nonlinear integrable fifth-order equation: multiple soliton solutions with unusual phase shifts”, *Physica Scripta*, vol. 93, pp. 115201, 2018.

JCR Impact Factor : 2.151

SJR : 0.534

SNIP : 0.761

H-index(Journal) : 71

Indexed in(Scopus/SCI/SCIE/others): SCIE, Scopus

Peer Reviewed(Yes/No) : Yes

Google Scholar Citation : 4

ISSN : 0031-8949

Website link : <https://iopscience.iop.org/article/10.1088/1402-4896/aaded5>

4. Gupta, D., **Kumar, L.**, Bég, O.A. and Singh, B., “Finite element analysis of MHD flow of micropolar fluid over a shrinking sheet with a convective surface boundary condition”, *Journal of Engineering Thermophysics*, vol. 27, No. 2, pp. 202–220, 2018.

JCR Impact Factor : 0.881

SJR : 0.399

SNIP : 0.974

H-index(Journal) : 17

Indexed in(Scopus/SCI/SCIE/others): SCIE, Scopus

Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 3
ISSN : 1810-2328
Website link :
<https://link.springer.com/article/10.1134/S1810232818020078>

5. Swapna, G., **Kumar, L., Rana, P.**, Kumari, A. and Singh, B. “Finite element study of radiative double-diffusive mixed convection magneto-micropolar flow in a porous medium with chemical reaction and convective condition”, *Alexandria Engineering Journal*, vol. 57, pp. 107--120, 2018.

JCR Impact Factor : 3.696
SJR : 0.711
SNIP : 1.984
H-index(Journal) : 36
Indexed in(Scopus/SCI/SCIE/others): SCIE, Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 5
ISSN : 1110-0168
Website link :
<https://www.sciencedirect.com/science/article/pii/S1110016816303180>

6. **Kaur L.**, Wazwaz A. M., “Dynamical analysis of lump solutions for (3+ 1) dimensional generalized KP–Boussinesq equation and Its dimensionally reduced equations”, *Physica Scripta*, vol. 93, pp. 075203, 2018.

JCR Impact Factor : 2.151
SJR : 0.534
SNIP : 0.761
H-index(Journal) : 71
Indexed in(Scopus/SCI/SCIE/others): SCI, Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 13
ISSN : 0031-8949
Website link : <https://iopscience.iop.org/article/10.1088/1402-4896/aac8b8/meta>

7. **Kaur L.**, Wazwaz A. M., “New exact solutions to extended (3+ 1)-dimensional Jimbo-Miwa equations by using bilinear forms”, *Mathematical Methods in the Applied Sciences*, vol. 41, pp.7566, 2018.

JCR Impact Factor : 1.533
SJR : 2.922
SNIP : 1.775
H-index(Journal) : 67
Indexed in(Scopus/SCI/SCIE/others): SCIE, Scopus
Peer Reviewed(Yes/No) : Yes

Google Scholar Citation : 1
ISSN : 1099-1476
Website link :
<https://onlinelibrary.wiley.com/doi/abs/10.1002/mma.5219>

8. **Kaur L.**, Wazwaz A. M., “Optical solitons for perturbed Gerdjikov–Ivanov equation”, *Optik*, vol.174, pp.447, 2018.

JCR Impact Factor : 1.914
SJR : 0.404
SNIP : 0.835
H-index(Journal) : 46
Indexed in(Scopus/SCI/SCIE/others): SCI, Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 3
ISSN : 0030-4026
Website link :

<https://www.sciencedirect.com/science/article/pii/S003040261831194X>

9. **Kaur L.**, Wazwaz A. M., “Painlevé analysis and invariant solutions of generalized fifth-order nonlinear integrable equation”, *Nonlinear Dynamics*, vol. 94, pp. 2469, 2018.

JCR Impact Factor : 4.604
SJR : 1.379
SNIP : 1.671
H-index(Journal) : 97
Indexed in(Scopus/SCI/SCIE/others): SCI, Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 9
ISSN : 1573-269X
Website link : <https://link.springer.com/article/10.1007/s11071-018-4503-8>

10. **Kaur L.**, Wazwaz. A. M., “Similarity solutions of field equations with an electromagnetic stress tensor as source”, *Romanian Reports in Physics*, vol. 70, pp. 1-12, 2018.

JCR Impact Factor : 1.582
SJR : 0.842
SNIP : 0.851
H-index(Journal) : 28
Indexed in(Scopus/SCI/SCIE/others): SCIE, Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 1221-1451
Website link : <http://www.rrp.infim.ro/IP/A356.pdf>

11. **Rana, P.** and Shukla, N. “Entropy generation analysis for non-similar analytical study of nanofluid flow and heat transfer under the influence of aligned magnetic field,” *Alexandria Engineering Journal*, vol 57, pp. 3299--3310, 2018.

JCR Impact Factor : 3.696
SJR : 0.711
SNIP : 1.984
H-index(Journal) : 36
Indexed in(Scopus/SCI/SCIE/others): SCIE, Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 1
ISSN : 1110-0168
Website link :

<https://www.sciencedirect.com/science/article/pii/S1110016818301261>

12. **Rana, P.,** Shukla, N., Beg, O. A., Kadir, A. and Singh, B. “Unsteady electromagnetic radiative nanofluid stagnation-point flow from a stretching sheet with chemically reactive nanoparticles, Stefan blowing effect and entropy generation,” *Proceedings of the Institution of Mechanical Engineers, Part N: Journal of Nanomaterials, Nanoengineering and Nanosystems*, vol. 232, pp. 69--82, 2018.

JCR Impact Factor : NIL
SJR : 0.21
SNIP : 0.613
H-index(Journal) : 15
Indexed in(Scopus/SCI/SCIE/others): Scopus, ESCI
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 3
ISSN : 2397-7914
Website link :

<https://journals.sagepub.com/doi/abs/10.1177/2397791418782030>

13. **Mittal, R.C.,** & Rohila, R., “Travelling and Shock Wave Simulations in a Viscous Burgers' Equation with Periodic Boundary Conditions”, *Int J. Computational and Applied Mathematics*, vol. 4, No. 16 , pp. 150,2018.

JCR Impact Factor : NIL
SJR : NIL
SNIP : NIL
H-index(Journal) : NIL
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 2349-5103
Website link :

<https://link.springer.com/article/10.1007/s40819-018-0582-y>

14. Sharma R., **Sharma S.**, Radaković Z., "Thermal Creep Analysis of Pressurized Thick-Walled Cylindrical Vessels", *Structural Integrity and Life*, Vol. 18, No 1, pp. 7–14, 2018.

JCR Impact Factor : NIL
SJR : 0.228
SNIP : 0.598
H-index(Journal) : 5
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 1451-3749
Website link :

<http://divk.inovacionicentar.rs/ivk/ivk18/ivk1801conts.html>

15. **Sharma S.**, Panchal R., "Creep stresses in functionally graded rotating orthotropic cylinder with varying thickness and density under internal and external pressure", *Structural Integrity and Life*, Vol.18, No.2, pp. 111-119, 2018.

JCR Impact Factor : NIL
SJR : 0.228
SNIP : 0.598
H-index(Journal) : 5
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 1451-3749
Website link : <http://divk.inovacionicentar.rs/ivk/ivk18/ivk1802-4.html>

16. **Sharma S.**, Yadav S., Sharma R., "Creep Torsion in Thick-Walled Circular Cylinder under Internal and External Pressure", *Structural Integrity and Life*, Vol.18, No.2, pp. 89-97, 2018.

JCR Impact Factor : NIL
SJR : 0.228
SNIP : 0.598
H-index(Journal) : 5
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 1451-3749
Website link : <http://divk.inovacionicentar.rs/ivk/ivk18/089-IVK2-2018-SS-SY-RS.pdf>

17. **Sharma S.**, Sharma R., Panchal R., “Creep Transition in Transversely Isotropic Composite Circular Cylinder Subjected to Internal Pressure”, *International Journal of Pure and Applied Mathematics*, Vol. 120, No. 1, pp. 87-96, 2018.

JCR Impact Factor : NIL
SJR : 0.127
SNIP : 0.480
H-index(Journal) : 20
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : 1
ISSN : 1311-8080
Website link : <https://ijpam.eu/contents/2018-120-1/8/8.pdf>

18. **Sharma S.**, Panchal R., “Elastic-Plastic Transition of Pressurized Functionally Graded Orthotropic Cylinder using Seth’s Transition Theory”, *Journal of Solid Mechanics*, Vol. 10, No. 2, pp. 450-463, 2018.

JCR Impact Factor : NIL
SJR : 0.267
SNIP : 0.339
H-index (Journal) : 12
Indexed in (Scopus/SCI/SCIE/others): Scopus
Peer Reviewed (Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 2008-3505
Website link : http://jsm.iau-arak.ac.ir/article_542601.html

19. **Sharma S.**, Yadav S., Radaković Z., “Finite Creep Deformation in Thick-Walled Circular Cylinder with Varying Compressibility under External Pressure”, *Structural Integrity and Life*, Vol. 18, No 1, pp. 31–36, 2018.

JCR Impact Factor : NIL
SJR : 0.228
SNIP : 0.598
H-index(Journal) : 5
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 1451-3749
Website link : <http://divk.inovacionicentar.rs/ivk/ivk18/031-IVK1-2018-SS-SY-ZR.pdf>

20. Yadav S., **Sharma S.**, “Torsion in Microstructure Hollow Thick-walled Circular Cylinder Made up of Orthotropic Material”, *Journal of Solid Mechanics*, Vol. 10, No. 3, pp. 581-590, 2018.

JCR Impact Factor : NIL

SJR : 0.267
SNIP : 0.339
H-index(Journal) : 12
Indexed in(Scopus/SCI/SCIE/others): Scopus
Peer Reviewed(Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 2008-3505
Website link : http://jsm.iau-arak.ac.ir/article_544407.html

21. Chauhan, V. and **Srivastava, P. K.**, “Trio-Geometric mean-based three-stage Runge–Kutta algorithm to solve initial value problem arising in autonomous systems,” *International Journal of Modeling, Simulation, and Scientific Computing*, vol. 9, no. 04, pp. 1850026, 2018.

JCR Impact Factor : NIL
SJR : 0.202
SNIP : 0.377
H-index (Journal) : 12
Indexed in (Scopus/SCI/SCIE/others): Scopus, ESCI
Peer Reviewed (Yes/No) : Yes
Google Scholar Citation : NIL
ISSN : 1793-9623
Website link :
<https://www.worldscientific.com/doi/abs/10.1142/S1793962318500265>

22. Kumar V., **Kaur L.**, Kumar A., Koksai M. E., “Lie symmetry based-analytical and numerical approach for modified Burgers-KdV equation”, *Results in physics*, vol. 8, pp.1136, 2018.

JCR Impact Factor : 3.042
SJR : 0.452
SNIP : 1.046
H-index (Journal) : 27
Indexed in (Scopus/SCI/SCIE/others): SCIE, Scopus
Peer Reviewed (Yes/No) : Yes
Google Scholar Citation : 6
ISSN : 2211-3797
Website link :
<https://www.sciencedirect.com/science/article/pii/S2211379717324567>

23. **Kumari, P.**, Modi, C., Sharma, V. K., “Dynamic response of normal moving load on a transversely isotropic piezoelectric half-space with parabolic irregularity”, *Waves in Random and Complex Media*, vol. 28(4), pp. 601-623.

JCR Impact Factor : 3.223
SJR : 0.624
SNIP : 0.897

H-index (Journal) : 40
 Indexed in (Scopus/SCI/SCIE/others): SCIE, Scopus
 Peer Reviewed (Yes/No) : Yes
 Google Scholar Citation : 4
 ISSN : 2211-3797
 Website link :
<https://www.tandfonline.com/doi/abs/10.1080/17455030.2017.1375167>

Event/Activity Organized:

S. No.	Conference/FDP/Workshop	Date
1.	Workshop on Emerging Computational Methods for Science and Engineering Applications	March 15-16, 2019

Expert Talks organised:

3. Expert talk on the topic “*Paranormed generalizations of L^p spaces*” delivered by Prof. Janusz Matkowski, Faculty of Mathematics, Computer Science and Econometrics Zielona GŰra University, Zielona GŰra, Poland, 07 March 2018.
4. Expert talk on the topic “*Fractal, Chaos - Mathematical Modeling*” delivered by Prof. Rashmi Bhardwaj, University School of Basic & Applied Sciences, Guru Gobind Singh Indraprastha University (GGSIPU), New Delhi, India, July 31, 2018.

(c) Statistics, Fuzzy, Information Theory and Operations Research

In this age of information revolution, the role of statistics, fuzzy sets, information theory and operations research are of prime importance. The statistical data are not always precise numbers, or vectors, or categories. Real data are frequently what is called fuzzy. Also, the results of measurements of such data can be best described by using fuzzy numbers and fuzzy vectors. Statistical analysis methods have to be adapted for the analysis of fuzzy data. Information theory deals with the study of problems concerning information processing, information storage, information retrieval and decision-making. This includes the study of uncertainty measures and various practical and economical methods of coding information for transmission. Operations research is

required to deal with wide range of problem-solving techniques applied in the pursuit of improved decision-making and efficiency, such as simulation, mathematical optimization, queueing theory and other stochastic-process models.

Group Coordinator: Dr. Amit Srivastava

List of faculty members: 10

Sl. No.	Name	Qualification	Designation	Specialization	Exp. Years as on 1.7.19	Guidance (Last 4 years)
1	Alka Tripathi	Ph.D. (BHU, Varanasi)	Professor and Head	Fuzzy Topology	23	Ph. D. Awarded=01 Ongoing = 02
2	A K Aggarwal	Ph.D. (HP University, Shimla)	Professor	Hydrodynamic Stability	27	Ph. D. Ongoing = 03
3	Amit Srivastava	Ph.D. (MNIT Jaipur)	Assistant Professor	Information & Coding Theory	19	Ph. D. Ongoing = 02
4	Pankaj Kumar Srivastava	Ph.D. (MNNIT, Allahabad)	Assistant Professor	Computational Methods, Fuzzy optimization	16	Ph. D. Ongoing = 04
5	Dinesh C. Singh Bisht	Ph.D. (G.B.Pant University, Utrakhand)	Assistant Professor	Soft Computing	11	Ph. D. Ongoing = 03
6	Himanshu Agarwal	Ph.D. (IIT Roorkee)	Assistant Professor	Image Processing	05	Ph. D. Ongoing = 01
7	Amita Bhagat	Ph.D. (IIT Roorkee)	Assistant Professor	Queueing Theory	04	Ph. D. Ongoing =NIL
8	Pinkey Chauhan	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	01	Ph. D. Ongoing=NIL
9	Neha Singhal	Ph.D. (IIT Roorkee)	Assistant Professor	Soft Computing	01	Ph. D. Ongoing=NIL
10	Deepti Agarwal*	Ph. D. (University of Delhi)	Assistant Professor	Operation Research	04	Ph. D. Ongoing=NIL

List of Publications 35

1. Mathur N., Srivastava, P. K., and Paul, A., "Algorithms for solving fuzzy transportation problem," *Int. J. Math. Oper. Res.*, vol. 12, no. 2, pp. 190–219, 2018.
2. Kumar, P., Pant, M., "Recognition of noise source in multi sounds field by modified random localized based DE algorithm", *International Journal of System Assurance Engineering and Management, Springer*. Vol 9, issue, 1, pp. 245-261, 2018
3. Srivastava, P. K. and Bisht, D. C. S., "Dichotomized Incenter Fuzzy Triangular Ranking Approach to Optimize Interval Data Based Transportation Problem," *Cybernetics and Information Technologies*, vol. 18, no. 4, pp. 111–119, 2018.
4. Jain S. , Mathpal P. C. , Bisht D. , and Singh P. , "A unique computational method for constructing intervals in fuzzy time series forecasting," *Cybern. Inf. Technol.*, vol. 18, no. 1, pp. 3–10, 2018.
5. Jain S. , Bisht D. C. , and Mathpal P. C. , "Particle swarm optimised fuzzy method for prediction of water table elevation fluctuation," *Int. J. Data Anal. Tech. Strateg.*, vol. 10, no. 2, pp. 99–110, 2018.
6. Bhardwaj, Anuj; Verma, Vivek Singh; Jha, Rajib Kumar, "Robust video watermarking using significant frame selection based on coefficient difference of lifting wavelet transform", *Multimedia Tools and Applications*, 77, pp. 19659-19678, 2018.
7. Prasad, Bhagwati and K. Mishra, A Novel Encryption Compression Scheme using Julia sets , *Int. J. Advanced Intelligence Paradigms*, Vol. 13, Nos. 1/2, 2019, pp.8-14.
8. Verma, D., Agarwal, H. and Aggarwal, A. K. "Recognition of Degraded and Non Degraded Roman Characters Using Different Classifiers", *Universal Journal of Electrical and Electronic Engineering*, vol.6, no. 5, pp. 402-419, 2019.
9. Verma, D., Agarwal, H. and Aggarwal, A.K. "3D motion trajectories recognition using optimal set of geometric primitives, angular and statistical features", *International Journal of Innovative Technology and Exploring Engineering*, vol. 9, no.2, 2019.
10. Verma, D., Agarwal, H. and Aggarwal, A. K. "Recognition of roman characters using geometric and regional features", *International Journal of Recent Technology and Engineering*, vol. 8, no. 3, 2019.
11. Agarwal H., Mathematical Formula of Performance of Watermarking System with Repetition of Bits of Watermark, *International Journal of Innovative Technology and Exploring Engineering*, 8(10), 3925-3929, 2019.
12. Srivastava, A. And Kaur, L. "Uncertainty and negation—Information theoretic applications" *International Journal of Intelligent systems*, Volume 34, Issue 6, Pages 1248-1260, 2019.
13. Nagar, P., Srivastava, A. and Srivastava, P. K., "Optimization of Species Transportation Via an exclusive fuzzy trapezoidal Centroid Approach" *Mathematics in Engineering, Science and Aerospace*, Volume 10, Issue 2, Pages 271-280, 2019.
14. Chhibber, D., Srivastava, P. K. and Bisht, D. C. S., "Average duo triangle ranking technique to solve fully and type-2 intuitionistic fuzzy transportation problem", *Nonlinear Studies*, 26(3), (2019), 487-504.

15. Bisht, D. C. S. and Srivastava, P. K., "One Point Conventional Model to Optimize Trapezoidal Fuzzy Transportation Problem", *International Journal of Mathematical, Engineering and Management Sciences*, 4(5), (2019), 1251-1263.
16. Srivastava, P. K. and Bisht, D. C. S., "Recent Trends and Applications of Fuzzy Logic", *Advanced Fuzzy Logic Approaches in Engineering Science*, 327-340 (2019).
17. Bisht D. C., Srivastava P. K., and Ram M., "Role of Fuzzy Logic in Flexible Manufacturing System," in *Diagnostic Techniques in Industrial Engineering*, Springer, pp. 233–243, 2018.
18. Srivastava, P. K., Bisht, D. and Ram, M., "Soft computing techniques and applications," in *Advanced Mathematical Techniques in Engineering Sciences*, Taylor & Francis Group, pp. 57-69, 2018.
19. Pughat A., Tiwari P., Sharma, V. And Singh N., "Communication, Localization, Coverage, Error and Control, Time Synchronization, Naming and Addressing, and Cross Layer issues," *Energy Efficient Wireless Sensor Networks, CRC Press (Taylor & Francis)* pp.27, 2017.
20. Chamola B.P. and Kumari P., "Mathematical Sciences and its Applications", Proceeding of International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2016)" , *AIP*, USA, 1802, 2016.
21. Chamola B.P. and Kumari P., "Advancement in Mathematical Sciences", Proceeding of 2nd International Conference on "Recent Advances in Mathematical Sciences and its Applications (RAMSA-2017)" , *AIP*, USA, 1897, 2017.
22. Chamola B.P. and Kumari P., "Emerging Trends in Mathematical Sciences and its Applications", Proceeding of 4th International Conference on "Recent Advances in Mathematical Sciences and its Applications" January 17-19, 2019.
23. Bisht, D. C. S. and Srivastava, P. K., "Fuzzy Optimization and Decision making", *Advanced Fuzzy Logic Approaches in Engineering Science*, 310-326 (2019).
24. Tripathi, A. And Tyagi K., "Rough Fuzzy (final) Automata", *AIP Conference Proceedings*, vol. 2061, pp. 020019, 2019.
25. Tripathi, A. And Kaur R., "A review of state minimization and state reduction techniques in fuzzy automata", *AIP Conference Proceedings*, vol. 2061, pp. 020033, 2019.
26. Agarwal H., Quantization based unified blind watermarking scheme, *AIP Conference Proceedings* 2061, 020032-01-020032-09 (2019).
27. Verma D., Agarwal H. and Aggarwal A. K., Palmprint Matching based on Normalized Correlation Coefficient and Mean Structural Similarity Index Measure, in *Proceedings of 4th International Conference on Harmony search, Soft computing and Applications, Advances in Intelligent Systems and Computing*, vol 741, pp. 193-202. Springer, 2019.
28. Srivastava, A. "Parametric evaluation of uncertainty in Markovian queues", *AIP Conference Proceedings* 2061 , (2019), pp. 020018.
29. Srivastava, A. "Medical diagnosis using intuitionistic fuzzy sets" *AIP Conference Proceedings*, 2061, (2019); pp.020029.

30. Mathur, N. and Srivastava, P. K.: A Pioneer Optimization Approach for Hexagonal Fuzzy Transportation Problem, “*AIP Conference Proceedings*” 2061, 020030, (2019).
31. Chhibber, D., Bisht, D. C. S. and Srivastava, P. K., “Ranking Approach Based On Incenter in Triangle of Centroids to Solve Type-1 and Type-2 Fuzzy Transportation Problem”, *AIP Conference Proceedings*, 2061, 020022, (2019).
32. Goyal, G. and Bisht, D.C. S. “An aggregated higher order fuzzy logical relationships technique,” *AIP Conference Proceedings*, vol. 2061, p. 020023, 2019.
33. A. Bhardwaj, A. Wadhwa, V.S. Verma, "Image enhancement in lifting wavelet transform domain", *AIP Conference Proceedings* 2061 (1), 020027, 2019.
34. S. Saxena, V. Sharma, V.S. Verma, A. Bhardwaj, "Robust digital image watermarking Scheme based on discrete fractional fourier transform", *AIP Conference Proceedings* 2061 (1), 020034, 2019.
35. Sethi R. and Bhagat A. (2019), “Performance analysis of machine repair problem with working vacation and service interruptions”, *AIP Conference Proceedings*, vol. 2061, pp. 020028-1–020028-8, 2019.

Events organized

S. No.	Events Organized	Date
1.	Faculty Development Program on Mathematical and Statistical Computations	July 09-14, 2018
2.	Workshop on Emerging Computational Methods for Science and Engineering Applications	March 15-16, 2019