

ABOUT US

Department of Mathematics is one of the basic science departments at IIT DELHI. Students with a commitment to pursuing research and career in pure, applied mathematics, and scientific computing for making a better future. They are groomed under apt academic rigor which enables them to acquire skills to form efficient solutions for the problems of industry and academics.



PROGRAMS

B.TECH IN MATHEMATICS & COMPUTING

B.TECH & M.TECH IN MATHEMATICS &
COMPUTING

M.Sc. IN MATHEMATICS



PLACEMENT BROCHURE 2019-20

MATHEMATICS DEPARTMENT



INDIAN INSTITUTE OF TECHNOLOGY
DELHI



AREAS OF RESEARCH

- ALGEBRA
- ALGORITHMS AND GRAPH THEORY
- APPLIED PROBABILITY
- COMBINATORIAL TOPOLOGY
- DYNAMICAL SYSTEMS AND FRACTALS
- FINANCIAL MATHEMATICS
- GAME THEORY
- HARMONIC ANALYSIS
- MACHINE TRANSLATION & ARTIFICIAL INTELLIGENCE
- NUMBER THEORY AND CRYPTOGRAPHY
- NUMERICAL ANALYSIS
- NUMERICAL LINEAR ALGEBRA
- OPTIMIZATION
- PARALLEL COMPUTING
- PARTIAL DIFFERENTIAL EQUATIONS
- STOCHASTIC MODELS

RESEARCH FACILITIES

SOFTWARES



- MODELICA
- MATLAB
- AXIOM
- MAXIMA
- GAMBIT
- MATHBUNTU
- SAGEMATH
- SCILAB

LAB



- VLSI Design and Tools Lab
- Data Analytics Lab

COURSES OFFERED

CORE

- ABSTRACT ALGEBRA
- LINEAR ALGEBRA AND APPLICATIONS
- COMPUTATIONAL METHODS IN DIFFERENTIAL EQUATIONS
- NUMERICAL ANALYSIS
- OPTIMIZATION
- REAL & COMPLEX ANALYSIS
- ADVANCED DESIGN OF ALGORITHMS
- STOCHASTIC PROCESSES
- THEORY OF COMPUTATION
- FUNCTIONAL ANALYSIS
- MULTIVARIATE AND STATISTICAL METHODS

ELECTIVES

NUMBER THEORY
COMBINATORICS
NUMERICAL OPTIMIZATION
NEUROCOMPUTING
CRYPTOGRAPHY
FINANCIAL MATHEMATICS
FRACTAL GEOMETRY
PARALLEL ALGORITHMS
STOCHASTIC OF FINANCE
GRAPH THEORY
MATHEMATICAL LOGIC
GAME THEORY

Department of Mathematics

Research Publications in 2018

International Journals

1. Renu Balyan, Niladri Chatterjee, Factor-based evaluation for English to Hindi MT outputs. *Language Resources and Evaluation*, 52(4): 2018, 969-996.
2. Neha Kaushik and Niladri Chatterjee, Automatic Relationship Extraction from Agricultural Text for Ontology Construction. *Information Processing in Agriculture*, 5, 2018, pp 60 – 73.
3. Yadav, N., and Niladri Chatterjee, Fuzzy Rough Set Based Technique for User Specific Information Retrieval: A Case Study on Wikipedia Data. *International Journal of Rough Sets and Data Analysis (IJRSDA)*, 5(4), 2018, pp. 32-47.
4. Anupam and S. Dharmaraja, An analytical model driven by fluid queue for battery life time of an user equipment in LTE-A networks, *Physical Communication*, 30 (2018) pp. 213 – 219.
5. Viswanathan Arunachalam, Garima Mishra and S. Dharmaraja, Optimal Number of Frames Transmitted in a Sensing Based Opportunistic Spectrum Access, *Physical Communication*, 26 (2018) pp. 156 – 161.
6. Sen, Chhanda and Kumar, Harish, Entropy stable schemes for ten-moment Gaussian closure equations. *J. Sci. Comput.* 75 (2018), no. 2, 1128–1155.
7. Meena, Asha Kumari and Kumar, Harish A well-balanced scheme for ten-moment Gaussian closure equations with source term. *Z. Angew. Math. Phys.* 69 (2018), no. 1, Art. 8, 31 pp.
8. Goel, Anubha; Sharma, Amita and Mehra, Aparna Index tracking and enhanced indexing using mixed conditional value-at-risk. *J. Comput. Appl. Math.* 335 (2018), 361–380.
9. Akhilesh Kumar, Anjana Gupta, Aparna Mehra, A Bilevel Programming Model for Operative Decisions on Special Trains: An Indian Railways Perspective *Journal of Rail Transport Planning and Management*, 8, 2018, 184-206.
10. Pooja Bansal, Aparna Mehra, Multi-period additive efficiency measurement in data envelopment analysis with non-positive and undesirable data, *Opsearch*, 2018, 642-661.
11. Mamata Sahu, Anjana Gupta, Aparna Mehra, Acceptably consistent incomplete interval-valued intuitionistic multiplicative preference relations. *Soft Computing*, 22, 2018, 7463-7477.
12. Patel, Kuldip Singh and Mehra, Mani Fourth-order compact scheme for option pricing under the Merton's and Kou's jump-diffusion models. *Int. J. Theor. Appl. Finance* 21 (2018), no. 4, 1850027, 26 pp.
13. Patel, Kuldip Singh and Mehra, Mani A numerical study of Asian option with high-order compact finite difference scheme. *J. Appl. Math. Comput.* 57 (2018), no. 1-2, 467–491.
14. Mani Mehra and Ratikanta Behera, An adaptive wavelet collocation method for solution of the convection-dominated problem on the sphere, *International Journal of computational methods*, Vol. 15 (1) (2018) pp. 1850080--1850098.

15. Panda, B. S.; Pandey, Arti and Paul, S. Algorithmic aspects of b-disjunctive domination in graphs. *J. Comb. Optim.* 36 (2018), no. 2, 572–590.
16. Priyadarshi, Amit and Sahu, Abhilash, Boundary value problem involving the p-Laplacian on the Sierpiński gasket. *Fractals* 26 (2018), no. 1, 1850007, 13 pp.
17. Kumar, Vishvesh; Sarma, R. and Shravan Kumar, N. Orlicz algebras on homogeneous spaces of compact groups and their abstract linear representations. *Mediterr. J. Math.* 15 (2018), no. 4, Art. 186, 13 pp.
18. Kushwaha, S. and Sarma, R, Continued fractions arising from F1,3. *Ramanujan J.* 46(2018), no. 3, 605–631.
19. Sarma, R.; Kumar, N. Shravan and Kumar Vishvesh, Multipliers on vector-valued L1-spaces for hypergroups. *Acta Math. Sin. (Engl. Ser.)* 34 (2018), no. 7, 1059–1073.
20. Jindal, Ankita; Laishram, Shanta and Sarma, Ritumoni, Irreducibility and Galois groups of generalized Laguerre polynomials $L_{(-1-n-r)n}(x)$. *J. Number Theory* 183 (2018), 388–406.
21. C. Mehl, V. Mehrmann, and P. Sharma, Structured eigenvalue/eigenvector backward errors of matrix pencils arising in optimal control, *Electronic Journal of Linear Algebra*, 34, pp. 526-560, 2018.
22. Udar, Dinesh; Sharma, R. K.; Srivastava, J. B. J-Boolean group rings and skew group rings. *J. Algebra Appl.* 17 (2018), no. 11, 1850210, 9 pp.
23. Gupta, Anju; Sharma, R. K. and Cohen, Stephen D., Primitive element pairs with one prescribed trace over a finite field. *Finite Fields Appl.* 54 (2018), 1–14.
24. Sharma, Rajendra K.; Awasthi, Ambrish; and Gupta, Anju Existence of pair of primitive elements over finite fields of characteristic 2. *J. Number Theory* 193 (2018), 386–394.
25. Garg, Chirag; and Sharma, R. K. A note on annihilator conditions in prime rings. *Rend. Circ. Mat. Palermo (2)* 67 (2018), no. 2, 197–204.
26. Garg, Chirag; Yadav, Vishal Kr.; and Sharma, R. K. A note on generalized (α, β) -derivation. *Southeast Asian Bull. Math.* 42 (2018), no. 4, 535–543.
27. Sahai, M.; Sharma, R. K.; and Kumari, P. Jordan regular generators of general linear groups. *J. Indian Math. Soc. (N.S.)* 85 (2018), no. 3-4, 422–433.
28. Gupta, Rohit; and Sharma, R. K. Further results on permutation polynomials of the form $(x^{pm}-x+\delta)s+x$ over F_{p^2m} . *Finite Fields Appl.* 50 (2018), 196–208.
29. Tiwari, S. K.; Sharma, R. K.; and Dhara, B. Some theorems of commutativity on semiprime rings with mappings. *Southeast Asian Bull. Math.* 42 (2018), no. 2, 279-292.
30. Anju; and Sharma, R. K. On primitive normal elements over finite fields. *Asian-Eur. J. Math.* 11 (2018), no. 2, 1850031, 14 pp.
31. Kumar, Yogesh; Mishra, P. R.; and Sharma, R. K. Nonlinearity of k-cycle permutations on Z_n . *Asian-Eur. J. Math.* 11 (2018), no. 2, 1850020, 13 pp.
32. Sharma, R. K.; Siwach, Reetu; and Sahai, Meena Group algebras of Lie nilpotency index 12 and 13. *Comm. Algebra* 46 (2018), no. 4, 1428–1446.
33. Vikas Vikram Singh and Abdel Lisser, Variational inequality formulation for the games with random payoffs, *Journal of Global Optimization*, Volv. 72(4), 743-760, 2018.
34. Rao, S. Chandra Sekhara; Kamra, Rabia A hybrid parallel algorithm for large sparse linear systems. *Numer. Linear Algebra Appl.* 25 (2018), no. 6, e2210, 16 pp.

35. Rao, S. Chandra Sekhara; and Manisha, Numerical solution of generalized Black-Scholes model. *Appl. Math. Comput.* 321 (2018), 401–421.
36. Rao, S. Chandra Sekhara and Chawla, Sheetal, Numerical solution of singularly perturbed linear parabolic system with discontinuous source term. *Appl. Numer. Math.* 127 (2018), 249–265.
37. Radha, R.; and Shravan Kumar, N. Weyl transform and Weyl multipliers associated with locally compact abelian groups. *J. Pseudo-Differ. Oper. Appl.* 9 (2018), no. 2, 229–245.
38. Giacomoni, J.; Mukherjee, T.; and Sreenadh, K. Doubly nonlocal system with Hardy-Littlewood-Sobolev critical nonlinearity. *J. Math. Anal. Appl.* 467 (2018), no. 1, 638–672.
39. Prashanth, S.; Tiwari, Sweta; and Sreenadh, K., Very singular problems with critical nonlinearities in two dimensions. *Commun. Contemp. Math.* 20 (2018), no. 2, 1650067, 25 pp.
40. Goel, Divya; Goyal, Sarika; and Sreenadh, K., First curve of Fučik spectrum for the p-fractional Laplacian operator with nonlocal normal boundary conditions. *Electron. J. Differential Equations* 2018, Paper No. 74, 21 pp.
41. Mukherjee, Tuhina; and Sreenadh, Konijeti On doubly nonlocal p-fractional coupled elliptic system. *Topol. Methods Nonlinear Anal.* 51 (2018), no. 2, 609–636.
42. Mukherjee, T.; and Sreenadh, K. On concentration of least energy solutions for magnetic critical Choquard equations. *J. Math. Anal. Appl.* 464 (2018), no. 1, 402–420.
43. Suchismita Patra, Srinivas Kumar V.V.K. Finite Element Approximation Using WEB-Splines for the Heat Equation, in Numerical Functional Analysis and Optimization, 39 (2018), no. 13, 1423-1439.
44. Punyani, Pooja; and Tripathi, Amitabha On changes in the Frobenius and Sylvester numbers. *Integers* 18B (2018), Paper No. A8, 12 pp.
45. Federico Elizeche, Edgar; and Tripathi, Amitabha On the nested local postage stamp problem. *Integers* 18 (2018), Paper No. A67, 13 pp.
46. Maran, Kaushik; Reddy, Sai Praneeth; Sharma, Dravyansh; and Tripathi, Amitabha Some results on a class of mixed van der Waerden numbers. *Rocky Mountain J. Math.* 48 (2018), no. 3, 885–904.
47. Peng, Shen; Singh, Vikas Vikram; and Lisser, Abdel General sum games with joint chance constraints. *Oper. Res. Lett.* 46 (2018), no. 5, 482–486.
48. Singh, Vikas Vikram; and Lisser, Abdel A characterization of Nash equilibrium for the games with random payoffs. *J. Optim. Theory Appl.* 178 (2018), no. 3, 998–1013.
49. Chand, A. K. B.; Viswanathan, P.; and Vijender, N. Bicubic partially blended rational fractal surface for a constrained interpolation problem. *Comput. Appl. Math.* 37 (2018), no. 1, 785–804.
50. Verma, S.; and Viswanathan, P. A note on Katugampola fractional calculus and fractal dimensions. *Appl. Math. Comput.* 339 (2018), 220–230.
51. Dinh, Hai Q.; Sharma, Anuradha; Rani, Saroj; Sriboonchitta, Songsak Cyclic and negacyclic codes of length 4ps over $F_{p^m} + uF_{p^m}$. *J. Algebra Appl.* 17 (2018), no. 9, 1850173, 22 pp.
52. Sharma, Anuradha; and Rani, Saroj, Trace description and Hamming weights of irreducible constacyclic codes. *Adv. Math. Commun.* 12 (2018), no. 1, 123–141.
53. Sharma, Anuradha and Kaur, Taranjot, Enumeration of complementary-dual cyclic F_q -linear F_{q^t} -codes. *Discrete Math.* 341 (2018), no. 4, 965–980.

54. Sharma, Anuradha and Kaur, Taranjot, Enumeration formulae for self-dual, self-orthogonal and complementary-dual quasi-cyclic codes over finite fields. *Cryptogr. Commun.* 10(2018), no. 3, 401–435.
55. Barman, Rupam and Ray, Chiranjit, Congruences for ℓ -regular over partitions and Andrews' singular over partitions. *Ramanujan J.* 45 (2018), no. 2, 497–515.
56. Khemchandani, Reshma; Saigal, Pooja; and Chandra, Suresh, Angle-based twin support vector machine. *Ann. Oper. Res.* 269 (2018), no. 1-2, 387–417.
57. Dhara, Basudeb; Pradhan, Krishna Gopal; and Tiwari, Shailesh Kumar, Engel type identities with generalized derivations in prime rings. *Asian-Eur. J. Math.* 11 (2018), no. 4, 1850055, 11 pp.
58. Chaudhary, Sudhakar, Crank-Nicolson-Galerkin finite element scheme for nonlocal coupled parabolic problem using the Newton's method. *Math. Methods Appl. Sci.* 41 (2018),no. 2, 724–749.
59. Chaudhary, Sudhakar, Finite element analysis of nonlocal coupled parabolic problem using Newton's method. *Comput. Math. Appl.* 75 (2018), no. 3, 981–1003.
60. Rani, Saroj, On cyclic and negacyclic codes of length $8\ell mpn$ over finite field. *Asian-Eur. J. Math.* 11 (2018), no. 5, 1850071, 17 pp.
61. D. Cardona and Vishvesh Kumar. Multilinear analysis for discrete and periodic pseudo-differential operators in \mathbb{R}^n - spaces, *Rev. Integr. temas Mat*, 36(2) 151-164 (2018).

Conference Proceedings

1. Shreemoyee Dutta Choudhury, Soubhik Chakraborty and Niladri Chatterjee. Raga Identification in Rabindra Sangeet by using Motif Discovery. ICCI-2018, Springer , Accepted on 16-10-2018.
2. Chatterjee, N., and Yadav, N. (2018). Hybrid Latent Semantic Analysis and Random Indexing Model for Text Summarization. In *Information and Communication Technology for Competitive Strategies*. Springer, Singapore, pp. 149-156.
3. Niladri Chatterjee, Gautam Jain, Gurkirat Singh Bajwa. Single Document Extractive Text Summarization using Neural Networks and Genetic Algorithm. *Computing Conference 2018*, London, IEEE, pp 203-212, 2018.
4. S. Ramakrishnan, S. Dharmaraja and Subrat Kar: Analysis of Computational Complexity and Power Consumption in Cloud Based Heterogeneous RAN, *National Conference on Communications*, IIT Hyderabad, Feb. 25 - 28, pp. 572 - 577, 2018.
5. B. S. Panda, Anita Das, Characterization and Recognition of Tree 3-Spanner Admissible Directed Path Graphs of Diameter Three. *44th WG* , Germany, 2018, *Lecture Notes in Computer Science*, 11159, Springer 2018, page: 369-381.
6. GillBarequet, Minati De, Michael T.Goodrich, Computing Convex-Straight-Skeleton Voronoi Diagrams for Segments and Convex Polygons. *COCOON 2018 (24th International Conference on Computing and Combinatorics*, Qing Dao, China, July 2-4, 2018):pp. 130-142.
7. Steven Chaplick, Minati De, Alexander Ravsky, Joachim Spoerhase: Approximation Schemes for Geometric Coverage Problems. *ESA 2018 (26th European Symposium of Algorithms*, Helsinki, Finland, August 20-22, 2018), pp. 17:1-17:15
8. Steven Chaplick, Minati De, Alexander Ravsky, Joachim Spoerhase: Brief Announcement: Approximation Schemes for Geometric Coverage Problems. *ICALP2018 (45th International Colloquium on Automata, Languages, and Programming*, ICALP 2018, July 9-13, 2018, Prague, Czech Republic): 107:1-107:4

Conference Proceedings edited

1. B. S. Panda, Partha P. Goswami (eds): Algorithms and Discrete Applied Mathematics - 4th International Conference, CALDAM 2018, Guwahati, India, February 15-17, 2018, Proceedings. Lecture Notes in Computer Science 10743, Springer 2018, ISBN 978-3-319-74179-6.

ONGOING PROJECTS

Name of the Investigator	Title of the project and duration	Amount sanctioned (in lakhs)	Funding Agency
N. Chatterjee (Professor)	Development of Predictive Data Analysis System using Artificial intelligence	130	Ministry of Finance Directorate General of Goods and Services Tax Intelligence
N. Chatterjee (Professor)	Hindi to English Machine Translation System for Judicial Domain	18.08	Ministry of Electronics and Information Technology, India
N. Chatterjee (Professor)	Solving Problems of Network Operations	225.6	NOKIA Solutions and Networks India Pvt. Ltd.
N. Chatterjee (Professor)	Hackathon for Solving Network Problems	75.6	NOKIA Solutions and Networks India Pvt. Ltd.
S. Dharmaraja (Professor)	Performance and Dependability Analysis and Development of Testbed of 5G Networks	43.04	Department of Telecommunication
Vikas Vikram Singh (Asstt. Professor)	Games and Optimization for Energy Management with Stochasticity-GAMES	19.08	DST (Indo-French)
Mani Mehra (Associate Professor)	“Wavelet Methods for PDEs on Network”	6.60	DST

Shravan Kumar (Asstt. Professor)	"Fourier Algebras on Ultraspherical Hypergroups	6.60	DST
Kamana Porwal (Asstt. Professor)	<ol style="list-style-type: none"> 1) Pointwise a Posterior Error Estimates of Finite Element Methods for the Elliptic Obstacle Problem 2) Finite Element Methods for Variational Inequalities of the second kind. 	6.60	DST MATRICS-SERB GRANT 9E019-2022) CSIR Extramural Research Grant (2019-2022)
Ritumoni Sarma (Associate Professor)	Study of New Types of Continues Fractions and Applications	6.60	DST Matrics Project
B.S. Panda (Professor)	DST Matrics Project	6.60	DST

RECRUITMENT PROCEDURE

JNF



Student-in-charge or placement officer, **Training and Placement Cell** shall provide the company a **Job Notification Form**.

JNF requires details of the job offer - role offered, pay package, place of posting, eligible documents.

Once the JNF with all the required details is received, companies are assigned username/password to access their online account at <http://tnp.iitd.ac.in>.

COMPANIES



Companies are also assigned space on the server on which they may upload any presentation, videos, etc. which they want students to see.

RECRUITMENT PROCEDURE

COMPANIES



The JNF has to be frozen on the Training and Placement Cell website by the company by a fixed date.

Students shall be able to view all the details, all the eligible candidates may apply.

After the application deadline for the students, the resumes are visible to the company. The company submits shortlist on its online account before a deadline.

SHORTLIST



Short-listed students get notified.

The placement office allots the dates for the campus interviews.

RECRUITMENT PROCEDURE

SELECTION



After the completion of the selection procedure on campus, company is required to announce **the final list** of the students on the same day itself.

If a student is selected, the job is registered against him/her then s/he would not be allowed to appear for more interviews as per the institute's policy.

RESUME VERIFICATION



All **claims** made by students in the resumes submitted for campus placement are duly **verified by the Placement Office**.

RECRUITMENT PROCEDURE



The **verification** standards are uniform throughout the Institute.

OUR RECRUITERS

 citigroup

P I M C O



BOSCH

ORACLE[®]

IBM

amazon

AMERICAN EXPRESS

GlobalLogic[®]

LEHMAN BROTHERS



Morgan
Stanley

 Microsoft[®]

 Symantec.

Google

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