

Nutan Kumar Tomar

Curriculum Vitae

Official (Corresponding) Address:

Department of Mathematics	Phone: +91-(0)-6115-233-021
Indian Institute of Technology Patna	Mobile: +91-(0)-9470836610
Bihta, Amhara Road	E-mail: chinidma@gmail.com
Patna-801 106, Bihar, INDIA	nktomar@iitp.ac.in

Research Interest: Mathematical Control Theory

Education:

PhD Indian Institute of Technology Roorkee, 2008.
MSc Indian Institute of Technology Roorkee, 2003.
BSc CCS University Meerut, 2001.

Academic Positions:

Associate Professor	Indian Institute of Technology Patna, 2017 - current
Assistant Professor	Indian Institute of Technology Patna, 2010 - 2017
Senior Lecturer	Indian Institute of Technology Patna, 2008 - 2010.
DAAD Research Fellow	University of Bayreuth, Germany, 2008.

Teaching:

UG (B.Tech)	Mathematics -I (Calculus), Mathematics -II (Linear Algebra and ODEs) Mathematics -III (Complex Analysis and PDEs), Matrix Computation Optimization Techniques
UG (M.Sc)	Real Analysis, Ordinary Differential Equations, Control Theory, Functional Analysis, Operators on Hilbert Spaces
PG (M.Tech)	Numerical Optimization, Large Scale Scientific Computing Advanced Engineering Mathematics
PG (PhD)	Analysis (Functional Analysis)

Sponsored Research Projects:

1. Systems described by differential and algebraic equations together: Analysis and Design. Funding Agency: SERB, New Delhi, India. Duration: Feb 2020 - Feb 2023. (Completed as PI)
2. Underwater target motion analysis with passive sensors. Funding Agency: NPOL, DRDO, India. Duration: March 2017 - March 2019. (Completed as Co-PI)(PI: Dr. Shovan Bhaumik, IIT Patna)
3. Descriptor systems: Modeling and control. Funding Agency: CSIR, New Delhi, India. Duration: April 2011 - March 2014. (Completed as PI).

Student Guidance: PhD Students

1. Vikas Kumar Mishra. *Controllability and Feedback Control Problems for Linear Time-Invariant Descriptor Systems*. 2011 - 2016.
2. Suman Kumar. *Controllability Analysis for Infinite-Dimensional Semilinear Systems*. 2010 - 2016.
3. Mahendra Kumar Gupta. *Observer Design for Irregular Descriptor Systems*. 2012 - 2016. Jointly Guidance with Dr Shovan Bhaumik, IIT Patna.
4. Arindam Kundu. *Modelling and Numerics For Arbitrage-Free Option Pricing using Bernstein Polynomial Basis*. 2010 - 2017. Jointly Guidance with Dr Sumit Kumar, IIM Udaipur.
5. Rahul Radhakrishnan. *Nonlinear Filtering: Extensions and Application to Target Tracking Problems*. 2013 - 2018. Jointly Guidance with Dr Shovan Bhaumik, IIT Patna.
6. Juhi Jaiswal. *Observability and Observer Design Problems for Linear Time-Invariant Descriptor Systems*. 2018 - 2022.
7. Pabitra Kumar Tunga. *Observer Design for Linear Descriptor Systems*. 2019 - current.
8. Ashna Goel. *Filtering techniques for for Networked Descriptor Systems*. 2020 - current. Jointly Guidance with Dr Shovan Bhaumik, IIT Patna.
9. Rishab Sharma. *Robust Observer Design for Nonlinear Descriptor Systems*. 2020 - current.

10. Jaffar Ali Lone. *Filtering for descriptor Systems: Extensions and Application to Li-Ion Battery State of Charge Estimation*. 2020 - current. Jointly Guidance with Dr Shovan Bhaumik, IIT Patna.
11. Pankaj Vadhvani. *Data-driven control for descriptor systems*. 2021 - current.

Student Guidance: M.Tech Students

1. Sonam Chandra. *Implementation of Descriptor Observer Design Approach to Synchronize Chaotic Systems for Secure Communication*. 2014 - 2015.
2. Ujjwal Pratap. *Study of Model Order Reduction Techniques for Descriptor Systems*. 2016 - 2017.
3. Ramen Ghosh. *Study of Wong Sequences for Solution of Differential Algebraic Equations*. 2016 - 2017.

Student Guidance: M.Sc Students

1. 2017 - 2018: Suman Kumari, Rani Kumari, Vaishaly Verma, Shivam Middha
2. 2020 - 2021: Ankita Yadav
3. 2021 - 2022: Bhabatosh Kanungo
4. 2022 - 2023: Dilip Sarkar, Shreya, Kanimozhi Karunanidhi

List of Publications: In Journals

1. J.A. Lone, N.K. Tomar, and S. Bhaumik, *Functional Observer Design for Parallel Connected Li-Ion Battery: A Descriptor Systems Theory Approach*, IEEE Control Systems Letters, vol. 7, 2023, pp. 961-966.[The contents of this paper are also selected by American Control Conference (ACC) Program Committee for presentation in ACC 2023 (to be held) at San Diego, California, USA, during May 31- June 2 2023.]
2. J. Jaiswal, T. Berger, and N.K. Tomar, *Partial Impulse Observability of linear descriptor systems*, Systems & Control Letters, volume 168, 2022, pp. 105352.
3. A. Kundu, S. Kumar, and N.K. Tomar, *A Semi-Closed Form Approximation of Arbitrage-Free Call Option Price Surface*, Computational Economics, (Accepted).
4. P.K. Tunga, J. Jaiswal, and N.K. Tomar, *Functional Observers for Descriptor Systems with Unknown Inputs*, IEEE Access, vol. 11, 2023, pp. 19680-19689.

5. J. Jaiswal and N.K. Tomar, *Existence conditions for ODE functional observer design of descriptor systems*, IEEE Control Systems Letters, vol. 6, 2022, pp. 355-360. [The contents of this paper are also selected by Conference on Decision and Control (CDC) Program Committee for presentation in (virtual) CDC 2021 at Austin, Texas, USA during December 13-15, 2021.]
6. J. Jaiswal, M.K. Gupta, and N.K. Tomar, *Necessary and sufficient conditions for ODE observer design of descriptor systems*, Systems & Control Letters, vol. 151, 2021, pp. 104916.
7. S. Kumar and N.K. Tomar, *Mild solution and controllability of second order nonlocal retarded semilinear systems*, IMA journal of Mathematical control and information, vol. 37(1), 2020, pp. 39-49.
8. R. Radhakrishnan, S. Bhaumik, and N.K. Tomar, *Continuous-discrete filters for bearings-only underwater target tracking problems*, Asian Journal of Control, vol. 21(4), 2019, pp. 1576-1586.
9. A. Kundu, S. Kumar, and N.K. Tomar, *Option Implied Risk-neutral Density Estimation: A Robust and Flexible Method*, Computational Economics, vol. 54(2), 2019, pp. 705-728.
10. R. Radhakrishnan, S. Bhaumik, and N.K. Tomar, *Gaussian sum shifted Rayleigh filter for underwater bearings-only target tracking problems*, IEEE Journal of Oceanic Engineering, vol. 44, 2019, pp. 492-501.
11. M.K. Gupta, N.K. Tomar, and M. Darouach, *Unknown inputs observer design for descriptor systems with monotone nonlinearities*, International Journal of Robust and Non-linear Control, vol. 28, 2018, pp. 5481-5494.
12. V.K. Mishra, N.K. Tomar, and M.K. Gupta, *Regularization and index reduction for linear differential-algebraic systems*, Computational and Applied Mathematics, vol. 37(4), 2018, pp. 4587-4598.
13. V.K. Mishra and N.K. Tomar, *Alternate checking criteria for reachable controllability of rectangular descriptor systems*, Kybernetika, vol. 53(5), 2017, pp. 820-837.
14. M.K. Gupta, N.K. Tomar, V.K. Mishra, and S. Bhaumik, *Observer design for semilinear descriptor systems with applications to chaos-based secure communication*, International Journal of Applied and Computational Mathematics, vol. 3(1), 2017, pp. 1313-1324.
15. V.K. Mishra, N.K. Tomar, and Mahendra Kumar Gupta *Index reduction for rectangular descriptor systems via feedbacks*, Cogent Engineering, vol. 4(1), 2017, pp. 1319786. Taylor & Francis Online. DOI: 10.1080/23311916.2017.1319786.

16. S. Kumar and N.K. Tomar, *Mild solution and constrained local controllability of semilinear boundary control systems*, Journal of Dynamical and Control Systems, vol. 23(4), 2017, pp. 735-751.
17. A. Kundu, S. Kumar, N.K. Tomar, and S. K. Gupta *Call option price function in Bernstein polynomial basis with no-arbitrage inequality constraints*, Journal of Inequalities and Applications, vol. 2016, 2016:153.
18. R. Radhakrishnan, A. K. Singh, S. Bhaumik, and N.K. Tomar *Multiple Sparse-grid Gauss-Hermite Filtering*, Applied Mathematical Modelling, vol. 40(7-8), 2016, pp. 4441-4450.
19. V.K. Mishra and N.K. Tomar, *On Complete and Strong Controllability for Rectangular Descriptor Systems*, Circuits, Systems, and Signal Processing, vol. 35(4), 2016, pp. 1395-1406.
20. M.K. Gupta, N.K. Tomar and S. Bhaumik, *On Detectability and Observer Design for Rectangular Linear Descriptor Systems*, International Journal of Dynamics and Control, vol. 4(4), 2016, pp. 438-446.
21. V.K. Mishra, N.K. Tomar, and Mahendra Kumar Gupta *On Controllability and Normalizability for Linear Descriptor Systems*, Journal of Control, Automation and Electrical Systems, vol. 27(1), 2016, pp. 19-28.
22. M.K. Gupta, N.K. Tomar and S. Bhaumik, *Full- and reduced-order observer design for rectangular descriptor systems with unknown inputs*, Journal of The Franklin Institute, vol. 352(3), 2015, pp. 1250-1264.
23. M.K. Gupta and N.K. Tomar, *PD Observer Design for Rectangular Linear Descriptor Systems*, Bharatiya Vaigyanik evam Audyogik Anusandhan Patrika, vol 23(1), June 2015, pp. 48-53. (In Hindi, Publisher: CSIR - NISCAIR)
24. M.K. Gupta, N.K. Tomar and S. Bhaumik, *Observer Design for Descriptor Systems with Lipschitz Nonlinearities: an LMI Approach*, Nonlinear Dynamics and Systems Theory, vol. 14(3), 2014, pp. 291-301.
25. N.K. Tomar and S. Kumar, *On Controllability of Nonlocal Retarded Semilinear Distributed Control Systems* Differential Equations and Dynamical Systems, vol. 21(3), 2013, pp. 215-223.
26. N.K. Tomar and J. Dabas, *Controllability of impulsive fractional order semilinear evolution equations with nonlocal conditions* Journal of Nonlinear Evolution Equation and Applications, vol. 2012(5), 2012, pp. 57-67.

27. N.K. Tomar and S. Kumar, *Approximate controllability of nonlocal semilinear time-varying delay control systems*, Nonlinear Dynamics and Systems Theory, vol. 12(3), 2012, pp. 303-310.
28. N.K. Tomar, N. Sukavanam and K. P. Singh, *Hybridization of Neural Nets and Genetic Algorithms to Compute the Boundary Control for Controlled Heat Equation*, European Journal of Pure and Applied Mathematics, vol. 4(2), 2011, pp. 117-128.
29. N.K. Tomar and N. Sukavanam, *Exact Controllability of Semilinear Third Order Dispersion Equation*, The Journal of Nonlinear Science and its Applications, vol 4(4), 2011, 308-314.
30. N.K. Tomar and N. Sukavanam, *Approximate Controllability of Non-densely defined Semilinear Delayed Control Systems*, Nonlinear Studies, vol 18(2), 2011, 229-234.
31. N.K. Tomar and N. Sukavanam, *Exact Controllability of Semilinear Thermoelastic System with Control Solely in Thermal Equation*, Numerical Functional Analysis and Optimization, vol. 29(9-10), 2008, pp. 1171-1179.
32. N. Sukavanam and N.K. Tomar, *Approximate Controllability of semilinear delay control systems*, Nonlinear Functional Analysis and Application, vol. 12(1), 2007, pp. 53-59.
33. N. Sukavanam and N.K. Tomar, *Approximate Controllability of semilinear control systems with Bounded Delay*, Int. J. Mathematical Sciences, vol. 5(1), 2006, pp. 77-84.

In Conference Proceedings

1. J. Jaiswal, P.K. Tunga, and N.K. Tomar. Functional ODE Observers for a class of Descriptor Systems. In: *Proceedings of 2022 Indian Control Conference (ICC)*. IEEE, 2022, (Accepted). (Place of conference: IIT Madras, India during December 14-16, 2022).
2. J.A. Lone, N.K. Tomar, and S. Bhaumik. Functional Observer Design for Li-Ion Battery State of Charge Estimation via Descriptor Systems Theory. In: *Proceedings of 2022 Australian & New Zealand Control Conference (ANZCC)*. IEEE, 2022, pp. 126-131, doi: 10.1109/ANZCC56036.2022.9966968. (Place of conference: Gold Coast, Australia during November 24-25, 2022).
3. R. Radhakrishnan, M. Saha, S. Bhaumik, and N.K. Tomar. Tracking and Interception of a Ballistic Target on Reentry Using Adaptive Gaussian Sum Quadrature Filters. In: *Communication and Control for Robotic Systems*. Series: Smart Innovation, Systems and Technologies, Springer, Singapore, vol 229, 2022, pp 255-272. (Eds: Gu J., Dey R., Adhikary N.) https://doi.org/10.1007/978-981-16-1777-5_16. (This chapter is an

- extended version of research article presented in (virtual) Symposium on Control, Communication and Embedded System for Robotics (SOCCER 2020) during 03-04 October 2020 at National Institute of Technology Silchar, India).
4. J. Jaiswal, M.K. Gupta, and N.K. Tomar. On Functional Observers for Descriptor Systems. In: *Proceedings of American Control Conference 2021 (ACC 2021)*. IEEE, 2021, pp. 4093-4098, doi: 10.23919/ACC50511.2021.9482902. (Place of (virtual) conference: New Orleans, Louisiana, USA during May 26-28, 2021).
 5. M.K. Gupta, N.K. Tomar, D. Sharma, and J. Jaiswal. PD observer design for Descriptor Systems with Unknown Inputs. In: *Proceedings of 5th IEEE Conference on Recent Advances and Innovations in Engineering (ICRAIE 2020)*. IEEE, 2020, pp. 1-5, doi: 10.1109/ICRAIE51050.2020.9358352. (Place of (virtual) conference: Poornima College of Engineering, Rajasthan, India during Dec 1-3, 2020)
 6. R. Radhakrishnan, S. Bhaumik, and N.K. Tomar. Continuous-Discrete Quadrature Filters for Intercepting a Ballistic Target on Reentry using Seeker Measurements. In: *Proceedings of Third IFAC International Conference on Advances in Control and Optimization of Dynamical Systems (ACODS 2018)*. IFAC-PapersOnLine Journal, Elsevier, vol. 51(1), 2018, pp. 383-388. (Place of Conference: Dr. APJ Abdul Kalam Missile Complex, Hyderabad, India during Feb 18 - 22, 2018)
 7. R. Radhakrishnan, S. Bhaumik, and N.K. Tomar. Continuous-discrete shifted Rayleigh filter for underwater passive bearings-only target tracking. In: *Proceedings of the Asian Control Conference (ASCC-2017)* IEEE, 2017. (Place of Conference: Gold Coast Convention Centre, Australia during Dec 17 - 20, 2017). DOI: 10.1109/ASCC.2017.8287272
 8. S. Chandra, M.K. Gupta, and N.K. Tomar. Observer Design Approach to Synchronize Lorenz Chaotic Systems for Secure Communication. In: *Proceedings of the International Conference on Computational Modelling and Simulation*, 2017. (Place of Conference: University of Colombo, Sri Lanka during May 17 - 19, 2017)
 9. R. Radhakrishnan, M. Saha, S. Bhaumik, and N.K. Tomar. Ballistic target tracking and its interception using suboptimal filters on reentry. In: *Proceedings of the Sixth International Symposium on Embedded Computing and System Design (ISED-2016)* IEEE, 2016. (Place of Conference: Indian Institute of Technology, Patna Bihta, India during Dec 15 - 17, 2016) DOI:10.1109/ISED.2016.7977096
 10. V.K. Mishra and N.K. Tomar. Controllability Analysis of Linear Time Invariant Descriptor Systems. In: *4th International Conference on Advances in Control and Optimization of Dynamical Systems (ACODS 2016)*, IFAC-PapersOnLine Journal, Elsevier,

- vol. 49(1), 2016, pp. 532-536. (Place of Conference: NIT Tiruchirappalli, India during Feb 01-05, 2016)
11. V.K. Mishra, N.K. Tomar, and M.K. Gupta. Impulse Controllability and Impulse Elimination in Rectangular Descriptor Systems. In: *15th International Conference on Control, Automation and Systems (ICCAS 2015)*, IEEE, 2015. (Place of Conference: BEXCO (Busan Exhibition Convention Center), Busan, Korea during October 13-16, 2015) DOI: 10.1109/ICCAS.2015.7364930
 12. S. Chandra, M.K. Gupta, and N.K. Tomar. Synchronization of Rössler Chaotic System for Secure Communication via Descriptor Observer Design Approach. In: *International Conference on Signal Processing, Computing and Control (ISPCC 2015)*, IEEE, 2015. (Place of Conference: Jaypee University of Information Technology Wagnaghat, Solan, India during Sep 24 - 26, 2015) DOI: 10.1109/ISPCC.2015.7375009
 13. R. Radhakrishnan, A.K. Singh, S. Bhaumik, and N.K. Tomar. Quadrature Filters for Underwater Passive Bearings-Only Target Tracking. In: *Sensor Signal Processing for Defence (SSPD 2015)*, IEEE, 2015. (Place of Conference: The University of Edinburgh, Scotland, United Kingdom during Sep 09 - 10, 2015) DOI: 10.1109/SSPD.2015.7288519
 14. R. Radhakrishnan, A.K. Singh, S. Bhaumik, and N.K. Tomar. IMM-Cubature Quadrature Kalman Filter for Manoeuvring Target Tracking. In: *International Conference on Signal Processing, Informatics, Communication and Energy Systems (SPICES 2015)*, IEEE, 2015, pp. 1-5. (Place of Conference: NIT Calicut, Kozhikode, India during Feb 19 - 21, 2015) DOI: 10.1109/SPICES.2015.7091498
 15. R. Radhakrishnan, S. Bhaumik, N.K. Tomar and A.K. Singh. Bearing only Tracking Using Sparse-grid Gauss-Hermite Filter. In: *International Conference on Intelligent Computing and Applications (ICICA 2014)*, Series: Advances in Intelligent Systems and Computing, Vol. 343, Springer, 2015, pp. 349-356 (Chapter 37) (Eds: Mandal, D., Kar, R., Das, S., Panigrahi, B.K.). (Place of Conference: NIT Durgapur, India during Dec 22-24, 2014)
 16. M.K. Gupta, N.K. Tomar and S. Bhaumik. PD observer design for linear descriptor systems. In: *International Conference on Mathematical Sciences (ICMS-2014)*, Elsevier, 2014, pp. 40 - 43. (Place of Conference: Sathyabama University, Chennai, India during July 17-19, 2014)
 17. M.K. Gupta, N.K. Tomar and S. Bhaumik. Detectability and observer design for linear descriptor systems. In: *22nd Mediterranean Conference on Control and Automation (MED 2014)*, IEEE, 2014, pp. 1094 - 1098. (Place of Conference: University of Palermo, Palermo, Italy during June 16 - 19, 2014) DOI: 10.1109/MED.2014.6961520

18. M.K. Gupta, N.K. Tomar and S. Bhaumik. On Observability of Irregular Descriptor Systems. In: *Advances in Control and Optimization of Dynamical Systems (ACODS 2014)*, IFAC, vol. 3(1), 2014, PP. 376-379. (Place of Conference: IIT Kanpur, Kanpur, India during March 13 - 15, 2014).
19. N.K. Tomar and N. Sukavanam. Exact Controllability of Semilinear Thermoelastic System with Control and non-linearity in Thermal Component Only. In: *ICIAM07, PAMM*, vol. 7(1), 2008, pp. 2030039 - 2030040. (Place of Conference: ETH Zurich and University of Zurich, Switzerland during July 16 - 20, 2007).

Conference and Workshop organization

1. Workshop on scientific computing, IIT Patna, Aug 02-03, 2012.
2. Tutorial series on algorithms and mathematical techniques used in simulation and verification tools for Integrated Circuits, IIT Patna, India, Aug-Sep, 2012.
3. Workshop on Sobolev Spaces, IIT Patna, February 16 - 23, 2017.
4. GIAN course on Beyond the Kalman filter: Bayesian recursive filtering in engineering and finance, IIT Patna, January 1 - 5, 2018.
5. National conference on recent trends in differential equation theory, modelling and computation (NCDE - 2019), IIT Patna, March 29-30, 2019.
6. National mathematics day 2020 events at IIT Patna. (Several lectures and competitions were organized during December 22 - 27, 2020.)
7. National science day 2021 celebration at IIT Patna on Feb 28, 2021.
8. Instructional school for mathematical foundations (ISMF 2022), IIT Patna, Oct 08 - 23, 2022 and Nov 05 - 19, 2022.
9. National conference on recent trends in differential equation theory, modelling and computation (NCDE - 2023), IIT Patna, March 17-19, 2023.
10. Annual Foundation School (AFS II), IIT Patna, 22 May - 17 June, 2023.

Honours and Awards

1. Invited lecture, *Existence conditions for ODE Functional Observer design of Descriptor Systems*. NIT Jamshedpur, October 27, 2021.

2. Best teacher award - 2017, 2018, 2019 from IIT Patna.
3. Invited lecture, *Online training program for school students*, Bihar Mathematical Society, Sep 4, 2021.
4. Session co-chair, Observers, *American Control Conference 2021 (ACC 2021)*, New Orleans, Louisiana, USA during May 26-28, 2021.
5. Invited lecture, *DAEs: A general mathematical framework for modeling and control*, Pandit Deendayal Petroleum University, Gandhinagar, Gujarat, India, Feb 7, 2021.
6. Invited lectures, *Applied Linear Algebra and Large Scale Scientific Computing: QIP Event*, IIT Roorkee, India, Jan 25-29, 2021.
7. Invited lecture, *Online training program for school students*, Bihar Mathematical Society, Dec 19, 2020.
8. Invited lectures, *TEQIP-III FDP on Essential Mathematics for Machine Learning with hands on training*, IIT Roorkee, India, Nov 23-27, 2020.
9. Invited lecture, *DAEs: Modelling, Analysis, and Control*. NIT Jamshedpur, October 14, 2020.
10. Lecture - CEP course on *Nonlinear Estimation for Engineers*, IIT Patna, Feb 1-5 2020.
11. Lecture - TEQIP event at LNJP Institute of Technology Chapra, Bihar, Jan 28-29, 2019.
12. Invited lectures, *Indo-German Workshop - Optimal control, Inverse problems and their applications*, IIT Delhi, India, Feb 6-9 2018.
13. Invited lectures, *Computational Science with Engineering Applications: QIP Event*, IIT Roorkee, India, June 12-16, 2017.
14. Invited, DAAD Alumina Event held at University of Colombo, Sri Lanka, May 17-19, 2017.
15. Session chair, Identification and Control, *22nd Mediterranean Conference on Control and Automation*, Palermo University, Italy, June 16-19, 2014.
16. Invited talk, *Introduction to Descriptor Systems*. SSV College Hapur, Uttar Pradesh (Event: National Conference on Future Perspectives of Science and Technology in Society and Governance), Nov 2014.

17. Invited talk, *Basics of Mathematics*. Akal College of Pharmacy and Technical Education, Mastuana Sahib, Sangrur, Punjab (Event: Inspire Internship Camp). March 2013.
18. Invited, DAAD Alumina Event held at National Institute of Technology, Calicut, India, March 28-31, 2011.
19. Lecture, *Controllability of Semilinear Control systems governed by PDEs*. Department of Engineering Mathematics, University of Bayreuth, Germany. June 2008.
20. Science Academies' Summer Research Fellowship 2009.
21. DAAD scholarship to visit University of Bayreuth, Germany, 2008.
22. Senior Research Fellowship from UGC, 2006-2008.
23. Student Travel Grant for ICIAM07, held at Zurich, Switzerland, July 16-20, 2007.
24. GATE in Mathematics - 2003.
25. NET (National Eligibility Test) in Mathematical Sciences - 2003.
26. Merit Scholarship from IIT Roorkee, 2001-02.

Membership of Professional Affiliations

1. Indian Mathematical Society (IMS).
2. Indian Society of Industrial and Applied Mathematicians (ISIAM).
3. IEEE member.

Institute and Department Services

1. Professor-in-Charge: Examination, Time Table, and Academic Calendar, IIT Patna, 2009 - 2015.
2. Secretary: Institute Faculty Meetings, IIT Patna, 2015 - 2017.
3. PhD coordinator: Department of Mathematics, IIT Patna, 2016 - 2018.
4. Professor-in-Charge: Institute Transport Committee, IIT Patna, 2017 - 2019.
5. HoD: Department of Mathematics, IIT Patna, 01.11.2021 - 14.03.2023.