

ABHINAV SINHA

🌐 <http://home.iitb.ac.in/~sinha.abhinav> ✉ abhinavsinha@aero.iitb.ac.in
in [linkedin.com/in/abhinav24](https://www.linkedin.com/in/abhinav24) 🐙 github.com/sinha-abhinav



🎓 EDUCATION

- 🏛 INDIAN INSTITUTE OF TECHNOLOGY BOMBAY, MUMBAI, INDIA** 2018 - PRESENT
Doctor of Philosophy (Ph.D.)
Specialization : Aerospace Engineering (Dynamics and Control)
Thesis : Cooperative Nonlinear Guidance Strategies Under Resource Constraints
Cooperative Guidance and Control Multiagent Systems Event-Based Control Sliding Mode Control
- 🏛 INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY, HOWRAH, INDIA** 2016 - 2018
Master of Technology (M.Tech.), G.P.A. 9.28/10
Specialization : Mechatronics
Thesis : Event-Based Cooperative Control of Multi-Agent Systems for Odor Source Localization in an Unknown Environment
Robot Olfaction Cooperative Control Multiagent Systems Event-Based Control Sliding Mode Control
- 🏛 KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY, BHUBANESWAR, INDIA** 2010 - 2014
Bachelor of Technology (B.Tech.), G.P.A. 8.46/10
Specialization : Electronics and Instrumentation
Thesis : Automated PID Tuning of Line Follower Robot
Robotics Control Systems Embedded Systems

👜 EXPERIENCE

- Jan 2019- Present** **INDIAN INSTITUTE OF TECHNOLOGY BOMBAY, MUMBAI, INDIA**
Teaching Assistant
 - AE 305 : Flight Mechanics– II, Spring 2019
 - AE 717 : Aircraft Flight Dynamics, Spring 2019
 - AE 410 : Navigation and Guidance, Fall 2019
 - AE 641 : Introduction to Navigation and Guidance, Fall 2019
- Jun 2019- May 2018** **CENTRAL SCIENTIFIC INSTRUMENTS ORGANISATION, CHANDIGARH, INDIA**
Research Student
 - Designed robust cooperative control protocols for multiagent systems tasked to locate source of an odor in an unknown environment characterized by heavy turbulence
- Sep 2014- Jul 2016** **TATA CONSULTANCY SERVICES LIMITED, PUNE, INDIA**
Assistant System Engineer, Consulting in Manufacturing, Automation and Control Systems
 - Worked on tools like WinCC SCADA, Kepware, Step7, Prosoft, etc. for Control System Integration (CSI); GE IP Proficy Suite, SAP ME, etc. for Manufacturing Execution Systems (MES); and SAP MII for Enterprise Manufacturing Intelligence (EMI)
 - Integrated data from factory floor machines with business layers for various productivity applications like reporting, dashboarding, monitoring, etc.
 - Configured multi master and sensor data integration directly to cloud
 - Provided plant network security and segmentation for several new manufacturing units
 - Worked towards enhancing efficiency in Manufacturing Operations Management (MOM)
- Nov 2015** **TATA CONSULTANCY SERVICES LIMITED, TRIVANDRUM, INDIA**
Visiting faculty at TCS Global Learning Center
 - Visited TCS Global Learning Centre at Trivandrum, India to impart hands on training on Manufacturing Operations Management (MOM) and the role of web technologies such as HTML, CSS, JavaScript, etc.
 - Introduced concepts of flow of data from factory floor to managerial layer and cloud; machine logic and business logic; and other aspects of role of engineering and IT in manufacturing

Jun 2011-
May 2014

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY, BHUBANESWAR, INDIA

Instructor and Coordinator, KIIT Robotics Society

- Managed students directly by teaching and training them about innovation in technology and science related to robotics and embedded systems. Control systems, automation and signal processing were integral parts of the course. From theory to applications, hobbyist electronics to complex machines, there were several other major areas of engineering which were explored and a forum of discussion over the same was created. Apart from academics, there were other things such as event management, competitions that were regularly organized to promote interest and developments in robotics and embedded systems

PUBLICATIONS

REFEREED JOURNALS

- [J1] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee “Cooperative Active Aircraft Protection Using Time Constrained Nonlinear Guidance”, *AIAA Journal of Guidance, Control, and Dynamics*, under review, 2020
- [J2] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee “Three-Dimensional Guidance With Terminal Time Constraints for Wide Launch Envelops”, *AIAA Journal of Guidance, Control, and Dynamics*, under review, 2020
- [J3] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Three Dimensional Nonlinear Cooperative Salvo Guidance for Simultaneous Interception Using Event-Triggered Strategy”, *International Journal of Control*, under review, 2019
- [J4] **Abhinav Sinha**, and S. R. Kumar, “Super-Twisting Control based Cooperative Salvo Guidance Using Leader-Follower Approach”, *IEEE Transactions on Aerospace and Electronic Systems*, in press, 2020
- [J5] T. Majumder, R. K. Mishra, **Abhinav Sinha**, S. S. Singh, and P. K. Sahu, “Robust congestion control in cognitive radio network using dynamic event-triggered sliding mode”, *International Journal of Communication Systems*, in press, 2019
- [J6] **Abhinav Sinha**, R. Kumar, R. Kaur and R. K. Mishra, “Consensus Based Odour Source Localisation by Multiagent Systems Under Resource Constraints”, *IEEE Transactions on Cybernetics*, in press, 2019
- [J7] **Abhinav Sinha**, R. Kumar, R. Kaur and A. P. Bhondekar, “Consensus Based Odour Source Localisation by Multiagent Systems”, *IEEE Transactions on Cybernetics*, vol. 49 (12), pp. 4450–4459, 2019
- [J8] R. K. Mishra, and **Abhinav Sinha**, “Event-triggered sliding mode based consensus tracking in second order heterogeneous nonlinear multi-agent systems”, *European Journal of Control*, vol. 45, pp. 30–44, 2019
- [J9] **Abhinav Sinha**, and R. K. Mishra, “Consensus in first order nonlinear heterogeneous multi-agent systems with event-based sliding mode control”, *International Journal of Control*, in press, 2018
- [J10] **Abhinav Sinha**, and R. K. Mishra, “Control of a nonlinear continuous stirred tank reactor via event triggered sliding modes”, *Chemical Engineering Science*, vol. 187, pp. 52–59, 2018
- [J11] T. Majumder, R. K. Mishra, **Abhinav Sinha**, S. S. Singh, and P. K. Sahu, “Congestion Control in Cognitive Radio Networks with Event-triggered Sliding Mode”, *AEU– International Journal of Electronics and Communication*, vol. 90, pp. 155–162, 2018
- [J12] **Abhinav Sinha**, and R. K. Mishra, “Nonlinear autonomous altitude control of miniature helicopter UAV based on sliding mode methodology”, *International Journal of Electronics and Communication Technology*, vol. 61, spl.- 1, Jan- Mar 2015

PEER REVIEWED CONFERENCE PROCEEDINGS

- [C1] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Three-Dimensional Nonlinear Interception Time Guidance for Stationary Targets”, *accepted, American Control Conference (ACC)*, Denver, USA, 1st-3rd Jul 2020
- [C2] **Abhinav Sinha**, D. Mukherjee, and S. R. Kumar, “Deviated Pursuit based Cooperative Simultaneous Interception against Moving Targets”, *accepted, American Control Conference (ACC)*, Denver, USA, 1st-3rd Jul 2020
- [C3] H. Bishwash, **Abhinav Sinha**, and S. R. Kumar, “Deviated Pursuit Based Nonlinear Impact-Time Guidance with Finite-Time Convergence”, *accepted, International Conference on Advances in Control and Optimization Of Dynamical Systems (ACODS 2020)*, Chennai, India, 16th-19th Feb 2020, **Awarded Best Paper**
- [C4] **Abhinav Sinha**, and S. R. Kumar, “Super-Twisting Control Based Impact Time Constrained Guidance”, *in Proc., Guidance, Navigation, and Control Conference (AIAA SciTech Forum)*, Orlando, USA, 6th-10th Jan 2020
- [C5] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Consensus Based Nonlinear Guidance for Cooperative Salvo”, *in Proc., 6th Indian Control Conference (ICC)*, Hyderabad, India, 18th-20th Dec 2019
- [C6] **Abhinav Sinha**, R. Kumar, and R. Kaur, “Resource Efficient Control Strategy for Consensus Based Odour Source Localisation by Multiagent Systems”, *accepted, 2018 IEEE Symposium Series on Computational Intelligence*, Bengaluru, India, 18th-21st Nov 2018
- [C7] **Abhinav Sinha**, and R. K. Mishra, “Convergence of multi-agent systems to unknown source of an odor”, *in Proc., 2018 IEEE 3rd International Conference for Convergence in Technology*, Pune, India, 7th-8th Apr 2018

- [C8] **Abhinav Sinha**, and R. K. Mishra, "Distributed cooperative control of multi agent systems for odor source localization", *accepted, International Conference on Advances in Control and Optimization Of Dynamical Systems (ACODS 2018)*, 18th-22nd Feb 2018
- [C9] **Abhinav Sinha**, and R. K. Mishra, "Temperature regulation in a Continuous Stirred Tank Reactor using event triggered sliding mode control", *IFAC PapersOnLine*, vol. 51, no. 1, pp. 401–406, 2018
- [C10] T. Majumder, **Abhinav Sinha**, R. K. Mishra, S. S. Singh, and P. K. Sahu, "Robust nonlinear congestion controller for time delayed and uncertain cognitive radio based wireless network", in *Proc., 2015 IEEE Power, Communication and Information Technology Conference (PCITC)*, Bhubaneswar, India, 15th-17th Oct 2015
- [C11] **Abhinav Sinha**, and R. K. Mishra, "Sliding mode controller design for high performance of permanent magnet stepper motor", in *Proc., 2015 IEEE International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)*, Coimbatore, India, 19th-20th Mar 2015
- [C12] **Abhinav Sinha**, and R. K. Mishra, "Robust altitude tracking of a miniature helicopter UAV based on sliding mode", in *Proc., 2015 IEEE International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)*, Coimbatore, India, 19th-20th Mar 2015
- [C13] T. Majumder, **Abhinav Sinha**, R. K. Mishra, S. S. Singh, and P. K. Sahu, "Robust nonlinear congestion controller for cognitive radio based wireless network", in *Proc., 2015 IEEE International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)*, Coimbatore, India, 19th-20th Mar 2015
- [C14] **Abhinav Sinha**, R. K. Mishra, and S. Jaiswal, "Robust and Smooth Nonlinear Control of an Industrial Robot for Automated Pick and Place", in *Proc., 2015 IEEE International Conference on Computing Communication Control and Automation (ICCCU-BCA)*, Pune, India, 26th-27th Feb 2015, **Awarded Best Paper**
- [C15] **Abhinav Sinha**, P. Prasoon, P. K. Bharadwaj, and A. C. Ranasinghe, "Nonlinear Autonomous Control of a Two-Wheeled Inverted Pendulum Mobile Robot Based on Sliding Mode", in *Proc., 2015 IEEE International Conference on Computational Intelligence and Networks (CINE)*, Bhubaneswar, India, 12th-13th Jan 2015
- [C16] A. C. Ranasinghe, K. Rasnayake, **Abhinav Sinha**, and K. K. Rasnayake, "Perturbing effect compensation technique for smart sensors", in *Proc., 7th IEEE International Conference on Information and Automation for Sustainability (ICIAfS)*, Colombo, Sri Lanka, 22nd-24th Dec 2014
- [C17] **Abhinav Sinha**, and R. K. Mishra, "Smooth sliding mode controller design for robotic arm", in *Proc., 2013 International Conference on Control, Automation, Robotics and Embedded Systems (CARE)*, Jabalpur, India, 16th-18th Dec 2013

BOOK CHAPTERS

- [BC1] **Abhinav Sinha**, and R. K. Mishra, "Smooth sliding mode control of a nonlinear CSTR using an inverse hyperbolic function-based law, *Foundations and Frontiers in Computer, Communication and Electrical Engineering : Proceedings of 3rd International Conference C2E2*, Mankundu, West Bengal, India, 15th-16th Jan 2016
- [BC2] T. Majumder, **Abhinav Sinha**, R. K. Mishra, S. S. Singh, and P. K. Sahu, "Congestion control in Cognitive Radio Networks using fractional order rate reaching law based sliding modes, *Foundations and Frontiers in Computer, Communication and Electrical Engineering : Proceedings of 3rd International Conference C2E2*, Mankundu, West Bengal, India, 15th-16th Jan 2016

ARTICLES OF ARCHIVAL QUALITY

- [A1] **Abhinav Sinha**, R. Kaur, R. Kumar, and A. P. Bhondekar, "Cooperative control of multi-agent systems to locate source of an odor", *ArXiv e-prints*, Nov 2017

POSITIONS OF RESPONSIBILITY

REVIEWER OF REFEREED JOURNALS

- > IEEE Transactions on Automatic Control
- > International Journal of Control
- > IEEE Transactions on Control Systems Technology
- > IEEE Transactions on System, Man and Cybernetics : Systems
- > Journal of The Franklin Institute (Elsevier)
- > European Journal of Control (Elsevier)
- > IET Control Theory and Applications
- > IEEE Transactions on Fuzzy Systems
- > IEEE Transactions on Aerospace and Electronic Systems
- > Information Sciences (Elsevier)
- > IEEE Access
- > IEEE Sensors Letters
- > Nonlinear Dynamics (Springer)
- > Advances in Space Research (Elsevier)

- > IET Generation, Transmission and Distribution
- > Asia Pacific Journal of Chemical Engineering (Wiley)
- > IEEE Transactions on Neural Networks and Learning Systems
- > Neurocomputing (Elsevier)
- > Swarm Intelligence (Elsevier)
- > Advances in Space Research (Elsevier)
- > IET Power Electronics

REVIEWER OF PEER REVIEWED CONFERENCES (SELECTED)

- > Americal Control Conference (ACC)
- > Control and Decision Conference (CDC)
- > Indian Control Conference (ICC)
- > IFAC World Congress
- > International Conference on Control, Decision and Information Technologies (CoDIT)
- > International Conference on Control and Automation (ICCA)
- > Mediterranean Conference on Control and Automation (MED)
- > International Conference on Advances in Computing, Communications and Informatics (ICACCI)
- > IFAC Advances in Control and Optimization of Dynamical Systems (ACODS)



PROFESSIONAL MEMBERSHIPS

- > Institute of Electrical and Electronics Engineers (IEEE)
- > International Federation of Automatic Control (IFAC)
- > Asian Control Association



AWARDS, ACHIEVEMENTS AND HONORABLE MENTIONS

- > **MHRD POSTGRADUATE GATE FELLOWSHIP** JUL 2016 - PRESENT
Ministry of Human Resource Development, India

Awarded for qualifying Graduate Aptitude Test in Engineering (GATE) with 96 percentile, a computer based standardized test conducted jointly by Indian Institute of Science and Indian Institutes of Technology on behalf of the National Co-ordination Board- GATE, Department of Higher Education, Ministry of Human Resource Development, Government of India for post graduate education in engineering and graduate employments in various Public Sector Undertakings under Government of India.

- > **CHAMPIONS OF INITIAL LEARNING PROGRAMME (ILP)** DEC 2015
TATA Consultancy Services Limited

Associated with the position of visiting faculty at TCS, and awarded for contribution towards Engineering and Industrial Services (EIS)- Talent Development in Manufacturing Operations Management domain.

- > **ON THE SPOT AWARD** JUL 2015
TATA Consultancy Services Limited

Awarded for the research work done in the field of Control Systems and allied areas, and for serving as research reviewer for many technical peer reviewed conferences in India and abroad.

- > **OUTSTANDING CONTRIBUTION AWARD** AUG 2013
KIIT Robotics Society, Kalinga Institute of Industrial Technology

Awarded for technical contribution towards the robotics society.