




ABHINAV SINHA

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



EDUCATION

-
-  **INDIAN INSTITUTE OF TECHNOLOGY BOMBAY** 2018 - 2020
Doctor of Philosophy (Ph.D.), Aerospace Engineering
Advisor : Dr. Shashi Ranjan Kumar
-  **INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY** 2016 - 2018
Master of Technology (M.Tech.), Mechatronics
Advisor : Dr. Ritesh Kumar (CSIR-CSIO), Dr. Rishemjit Kaur (CSIR-CSIO)
-  **KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY** 2010 - 2014
Bachelor of Technology (B.Tech.), Electronics and Instrumentation

EXPERIENCE

-
- May 2021- Present | **INDIAN INSTITUTE OF TECHNOLOGY BOMBAY, MUMBAI, INDIA**
Postdoctoral Fellow
- Jan 2019- May 2021 | **INDIAN INSTITUTE OF TECHNOLOGY BOMBAY, MUMBAI, INDIA**
Teaching Assistant
- > AE 305 : Flight Mechanics– II, Spring 2019, 2020, and 2021
 - > AE 717 : Aircraft Flight Dynamics, Spring 2019, 2020, and 2021
 - > AE 410 : Navigation and Guidance, Fall 2019 and 2020
 - > AE 641 : Introduction to Navigation and Guidance, Fall 2019 and 2020
- Jun 2019- May 2018 | **CENTRAL SCIENTIFIC INSTRUMENTS ORGANISATION, CHANDIGARH, INDIA**
Research Student
- Sep 2014- Jul 2016 | **TATA CONSULTANCY SERVICES LIMITED, PUNE, INDIA**
Assistant System Engineer, Consulting in Manufacturing, Automation and Control Systems
- Nov 2015 | **TATA CONSULTANCY SERVICES LIMITED, TRIVANDRUM, INDIA**
Visiting faculty at TCS Global Learning Center
- Jun 2011- May 2014 | **KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY, BHUBANESWAR, INDIA**
Instructor and Coordinator, KIIT Robotics Society

PUBLICATIONS

REFEREED JOURNALS– PUBLISHED/IN PRESS

- [J1] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee “Impact time constrained integrated guidance and control design”, *Aerospace Science and Technology*, vol. 115, pp. 106824, 2021.
- [J2] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee “Nonsingular impact time guidance and control using deviated pursuit”, *Aerospace Science and Technology*, vol. 115, pp. 106776, 2021.

- [J3] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Cooperative Salvo Based Active Aircraft Defense Using Impact Time Guidance”, *IEEE Control Systems Letters*, vol. 5, no. 5, pp. 1573–1578, 2021 (also accepted for presentation at 2021 American Control Conference, New Orleans, Louisiana, USA).
- [J4] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee “Three-Dimensional Nonlinear Cooperative Salvo Using Event-Triggered Strategy”, *AIAA Journal of Guidance, Control, and Dynamics*, vol. 44, no. 2, pp. 328–342, 2021.
- [J5] **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*, vol. 44, no. 2, pp. 343–359, 2021.
- [J6] **Abhinav Sinha**, and S. R. Kumar, “Super-Twisting Control Based Cooperative Salvo Guidance Using Leader-Follower Approach”, *IEEE Transactions on Aerospace and Electronic Systems*, vol. 56, no. 5, pp. 3556–3565, 2020.
- [J7] **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*, vol. 93, no. 4, pp. 858–871, 2020.
- [J8] **Abhinav Sinha**, R. Kumar, R. Kaur and R. K. Mishra, “Consensus-Based Odor Source Localization by Multiagent Systems Under Resource Constraints”, *IEEE Transactions on Cybernetics*, vol. 50, no. 7, pp. 3254–3263, 2020.
- [J9] **Abhinav Sinha**, R. Kumar, R. Kaur and A. P. Bhondekar, “Consensus-Based Odor Source Localization by Multiagent Systems”, *IEEE Transactions on Cybernetics*, vol. 49, no. 12, pp. 4450–4459, 2019.
- [J10] 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.
- [J11] 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*, vol. 33, no. 10, pp. e4206, 2019.
- [J12] **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.
- [J13] 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.
- [J14] **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.

REFEREED JOURNALS– UNDER REVIEW

- [J15] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Cooperative Integrated Guidance and Control Design for Simultaneous Interception”, under review.
- [J16] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Three-agent Time-constrained Cooperative Pursuit-Evasion”, under review. [Preprint available at arXiv:2106.01895]
- [J17] **Abhinav Sinha**, and S. R. Kumar, “Cooperative Target Capture using Predefined-time Consensus over Fixed and Switching Networks”, under review. [Preprint available at arXiv:2109.01338]

REFEREED JOURNALS– UNDER PREPARATION

- [J18] H. Bishwash, **Abhinav Sinha**, and S. R. Kumar, “Deviated Pursuit based Predefined-time Convergent Impact Time Guidance with Obstacle Avoidance.”

- [J19] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Consensus-based Simultaneous Interception of Moving Targets using Deviated Pursuit.”

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*, Taylor and Francis, 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*, Taylor and Francis, 2016.

PEER REVIEWED CONFERENCE PROCEEDINGS

- [C1] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Integrated Guidance and Control For Dual Control Interceptors Under Impact Time Constraint”, in *Proc., Guidance, Navigation, and Control Conference (AIAA SciTech Forum)*, Virtual Event, 11th-15th and 19th-21st Jan 2021.
- [C2] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Three-Dimensional Nonlinear Interception Time Guidance for Stationary Targets”, in *Proc., American Control Conference (ACC)*, Denver, USA, 1st-3rd Jul 2020.
- [C3] **Abhinav Sinha**, D. Mukherjee, and S. R. Kumar, “Deviated Pursuit based Cooperative Simultaneous Interception against Moving Targets”, in *Proc., American Control Conference (ACC)*, Denver, USA, 1st-3rd Jul 2020.
- [C4] H. Bishwash, **Abhinav Sinha**, and S. R. Kumar, “Deviated Pursuit Based Nonlinear Impact-Time Guidance with Finite-Time Convergence”, *IFAC PapersOnLine*, vol. 53, no. 1, pp. 93–98, 2020, **Awarded Best Paper**.
- [C5] **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.
- [C6] **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.
- [C7] **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.
- [C8] **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.
- [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 (ICCUBEA)*, Pune, India, 26th-27th Feb 2015, **Awarded Best Paper**.
- [C15] **Abhinav Sinha**, P. Prason, 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.

OTHERS

- [A1] **Abhinav Sinha**, S. R. Kumar, and D. Mukherjee, “Integrated Guidance and Control Design For Time-Constrained Interception”, *IEEE TechRxiv*, 2020.
- [A2] **Abhinav Sinha**, R. Kaur, R. Kumar, and A. P. Bhonekar, “Cooperative control of multi-agent systems to locate source of an odor”, *arXiv:1711.03819, arXiv e-prints*, 2017.

PROFESSIONAL SERVICES

REVIEWER OF REFEREED JOURNALS

- > IEEE Transactions on Automatic Control
- > International Journal of Control
- > IEEE Transactions on Control Systems Technology
- > International Journal of Robust and Nonlinear Control
- > IEEE Transactions on System, Man and Cybernetics : Systems
- > IEEE Transactions on Cybernetics
- > Journal of The Franklin Institute
- > European Journal of Control
- > IET Control Theory and Applications
- > AIAA Journal of Guidance, Control, and Dynamics
- > IEEE Control Systems Letters
- > IEEE Transactions on Fuzzy Systems
- > IEEE Transactions on Aerospace and Electronic Systems
- > IEEE Transactions on Neural Networks and Learning Systems
- > Asian Journal of Control
- > Information Sciences
- > IEEE Transactions on Industrial Informatics
- > ISA Transactions
- > Journal of Process Control
- > IEEE Access
- > IEEE Systems Journal
- > IEEE Sensors Letters
- > Nonlinear Dynamics

- > Advances in Space Research
- > IET Generation, Transmission and Distribution
- > Chemical Engineering Science
- > Asia Pacific Journal of Chemical Engineering
- > Journal of Computational Science
- > Neurocomputing
- > Swarm Intelligence
- > IET Power Electronics
- > Journal of Aerospace Engineering
- > IEEE Journal of Emerging and Selected Topics in Industrial Electronics
- > Plos One

REVIEWER OF PEER REVIEWED CONFERENCES (SELECTED)

- > American Control Conference (ACC)
- > Control and Decision Conference (CDC)
- > Indian Control Conference (ICC)
- > European Control Conference (ECC)
- > 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)
- > IFAC Advances in Control and Optimization of Dynamical Systems (ACODS)
- > International Conference on Advances in Computing, Communications and Informatics (ICACCI)



PROFESSIONAL MEMBERSHIPS

- > Institute of Electrical and Electronics Engineers (IEEE)
- > IEEE Aerospace and Electronic Systems Society (AESS)
- > International Federation of Automatic Control (IFAC)
- > Asian Control Association



AWARDS, ACHIEVEMENTS AND HONORABLE MENTIONS

- | | |
|---|---------------------|
| <ul style="list-style-type: none"> > ACC STUDENT TRAVEL GRANT
<i>American Automatic Control Council, USA</i> | MAY 2021 |
| <ul style="list-style-type: none"> > ACC STUDENT TRAVEL GRANT
<i>American Automatic Control Council, USA</i> | JUN 2020 |
| <ul style="list-style-type: none"> > ICC STUDENT SUPPORT
<i>Indian Control Conference and IEEE-CSS</i> | DEC 2019 |
| <ul style="list-style-type: none"> > MHRD POSTGRADUATE GATE FELLOWSHIP
<i>Ministry of Human Resource Development, India</i> | JUL 2016 - APR 2021 |
| <ul style="list-style-type: none"> > CHAMPIONS OF INITIAL LEARNING PROGRAMME (ILP)
<i>TATA Consultancy Services Limited</i> | DEC 2015 |
| <ul style="list-style-type: none"> > ON THE SPOT AWARD
<i>TATA Consultancy Services Limited</i> | JUL 2015 |
| <ul style="list-style-type: none"> > OUTSTANDING CONTRIBUTION AWARD
<i>KIIT Robotics Society, Kalinga Institute of Industrial Technology</i> | AUG 2013 |

“ REFERENCES

Dr. Shashi Ranjan Kumar

Assistant Professor

Department of Aerospace Engineering
Indian Institute of Technology Bombay

✉ srk@aero.iitb.ac.in

☎ +91 22 2576 7108

Dr. Dwaipayan Mukherjee

Assistant Professor

Department of Electrical Engineering
Indian Institute of Technology Bombay

✉ dm@ee.iitb.ac.in

☎ +91 22 2576 9426