RESUME

Dr. Gangireddy Sushnigdha

Assistant Professor

Department of Electrical Engineering

SVNIT Surat

Phone No: **+91-9167924418 (M)**

E-mail: **sushnigdha@eed.svnit.ac.in**

Areas of interest

Guidance and trajectory optimization of entry vehicles, path planning of autonomous vehicles, developing meta-heuristic algorithms, and application of artificial intelligence based techniques to optimal control problems

Educational qualifications

Qualification	Discipline/Area	Year	Board/Institution
Ph.D.	Pigeon Inspired Optimization based Trajectory Design Strategies for Re-entry Vehicles	2018	Indian Institute of Technology Bombay, Mumbai, India
M.E.	Electrical Engineering (Control Systems)	2012	National Institute of Technology Kurukshetra, Kurukshetra, India
B. Tech.	Electrical and Electronics Engineering	2010	JNT University, Kakinada
Intermediate	Maths, Physics & Chemistry	2006	Board of Intermediate Education, A.P
SSC	Not Applicable	2004	Board of Secondary Education, A.P

Professional Details

Sl. No	Institute/Industry	Position	Duration	
			From	To
1.	NIT Kurukshetra, Kurukshetra	Assistant Professor on contract	November 2012	June 2013
2.	REVA Institute of Technology and Management, Bangalore	Assistant Professor	August 2013	July 2014
3.	Sardar Vallabhbhai National Institute of Technology, Surat	Assistant Professor	5th November 2019	Till date

Skills

Simulation platforms: MATLAB/Simulink®, LabView

Real-time simulation: OPAL-RT

Hardware-in-the-loop implementation: OP4510 and TMS 28335 controller

UG and PG Courses Taught

Basic Electrical Engineering, Control Systems, State Variable Analysis, Nonlinear and Optimal Control, Optimal and Adaptive Control, System Theory, Parameter Estimation and Control

Research publications

International Journals:

1. **Gangireddy Sushnigdha** and Ashok Joshi, “Evolutionary method based integrated guidance strategy for reentry vehicles”, *Engineering Applications of Artificial Intelligence* (Elsevier), vol. 69, pp. 168 - 177, 2018.
2. **Gangireddy Sushnigdha** and Ashok Joshi, “Re-entry Trajectory Design with Pigeon Inspired Optimization using derived Angle of Attack profile”, *Journal of Aerospace Engineering*, vol. 31, no. 6, pp. 04018104, 2018.
3. **Gangireddy Sushnigdha** and Ashok Joshi, “Re-entry Trajectory Optimization using Pigeon Inspired Optimization Based Control Profiles”, *Advances in Space Research*, vol. 62, no. 11, pp. 3170-3186, 2018.
4. Aeidapu Mahesh and **Gangireddy Sushnigdha, “**A Novel Search Space Reduction Optimization Algorithm”, *Soft Computing,* vol. 25, pp. 9455-9482*,* 2021.
5. Aeidapu Mahesh and **Gangireddy Sushnigdha*, “***Optimal Sizing of Photovoltaic/Wind/Battery Hybrid Renewable Energy System Including Electric Vehicles using Improved Search Space Reduction Algorithm”, *Journal of Energy Storage,* vol. 56, pp. 105866, 2022.
6. Deepak Mishra**, Gangireddy Sushnigdha**, "A novel re-entry trajectory design strategy enforcing inequality and terminal constraints in height-velocity plane", *Advances in Space Research*, vol. 73, issue 5, pp. 2515-2531, 2024.
7. Deepak Mishra, **Gangireddy Sushnigdha**, “Neural network-based hardware-in-the-loop implementation of fourier series parametrized control profiles for re-entry vehicles", *Advances in Space Research*, vol. 73, issue 9, pp. 4782-4799, 2024.
8. Deepak Mishra, **Gangireddy Sushnigdha,** “Neural Network-driven Re-entry Reference Trajectory Design and Tracking Using Sliding Mode Control”, accepted for publication in ASCE's Journal of Aerospace Engineering on 29th May 2025.

International Conferences:

1. **Gangireddy Sushnigdha** and Ashok Joshi, “Evolutionary Method Based Hybrid Entry Guidance Strategy for Reentry Vehicles", IFAC-PapersOnLine, vol. 49, Iss. 5, pp. 339-344, ICONS 2016, Reims, France, 2016.
2. **Gangireddy Sushnigdha** and Ashok Joshi, “Re-entry Trajectory Design using Pigeon Inspired Optimization", Paper No. 2017-4209, AIAA Atmospheric Flight Mechanics Conference, Denver, Colorado, AIAA AVIATION Forum, 2017.
3. **Gangireddy Sushnigdha** and Ashok Joshi. “Trajectory Design of Re-entry Vehicles using combined Pigeon Inspired Optimization and Orthogonal Collocation method", IFAC-PapersOnLine, vol. 51, Iss. 1, pp. 656-662, ACODS 2018, Hyderabad, India, 2018.
4. **G. Sushnigdha** and A. Mahesh, "On Convergence of Pigeon Inspired Optimization Algorithm," *2019 Sixth Indian Control Conference (ICC),* Hyderabad, India, 2019, pp. 152-157, doi: 10.1109/ICC47138.2019.9123217.
5. **Gangireddy Sushnigdha, “**Trajectory Optimization of Space Maneuver Vehicle using Grey Wolf Optimizer”, presented at International Conference on Soft Computing for Problem Solving, IIT Indore 2020.
6. **Gangireddy Sushnigdha, “**Grey Wolf Optimizer based Orthogonal Collocation Approach for Trajectory Optimization of Space Shuttle”, presented at International Conference on Soft Computing for Problem Solving, IIT Indore 2020.
7. Aeidapu Mahesh and **Gangireddy Sushnigdha,** “Grey Wolf Optimizer based Selective Harmonic Elimination for a Cascade H-bridge Multilevel Inverter”, presented at International Conference on Soft Computing for Problem Solving, IIT Indore 2020.
8. **Gangireddy Sushnigdha**, “Spacecraft Reentry Trajectory Optimization using Search Space Reduction Technique”, IFAC-PapersOnLine, Vol. 55, Iss. 1, pp. 46-51, ACODS 2022, NIT Sikkim, India, 2022.
9. Vishwa Pal Singh, K. Karthikeyan and **Gangireddy Sushnigdha**, “Comparison of LQG and ADRC based wind disturbance rejection schemes for deep space antenna”, TENSYMP 2022, organized at IIT Bombay from 1-3 July 2022.

10. Swapnil Srivastava, Deepak Mishra, **Gangireddy Sushnigdha**, “Fourier series and Search Space Reduction based Control profiles for Reentry Trajectory Optimization”, Accepted for presentation in 22nd IFAC Symposium on Automatic Control in Aerospace, ACA 2022 to be held at IIT Bombay, 21-25 November 2022.
11. Manny Shankar, **Gangireddy Sushnigdha, “**A Hybrid Path planning approach combining Artificial Potential Field and Particle Swarm Optimization for Mobile Robot”, Accepted for presentation in 22nd IFAC Symposium on Automatic Control in Aerospace, ACA 2022 to be held at IIT Bombay, 21-25 November, 2022.
12. Shantanu Kumar Singh and **Gangireddy Sushnigdha**, “Re-entry trajectory design using Chebyshev-Lobatto collocation and Piecewise Cubic Hermite Interpolating polynomial based control profiles”, International Conference on Systems Control and Automation, 13 May 2023, NIT Kurukshetra.
13. Gopinath Mekala and **Gangireddy Sushnigdha**, "Azimuth position control of rigid deep space antenna using MPC and LQG controllers", International Conference on Systems Control and Automation, 13 May 2023, NIT Kurukshetra.
14. Deepak Mishra and **Gangireddy Sushnigdha**, "Re-entry Trajectory Optimization using Orthogonal Collocation-based Parametrization and Sequential Quadratic Programming Method", International Conference on Systems Control and Automation, 13 May 2023, NIT Kurukshetra.

Books Edited:

1. J S Lather, Arunesh Kumar Singh, **Gangireddy Sushnigdha**, Editors of the book titled "Proceedings of the International Conference on Systems, Control and Automation" ICSCA 2023, Series Title: Lecture Notes in Electrical Engineering, Publisher: Springer Singapore, **Softcover ISBN** 978-981-97-7383-1, December 2024.

Research Projects

- SEED grant project titled “Trajectory Optimization of Reentry Vehicles using combined Metaheuristic and Collocation based methods” funded by SVNIT, Budget: 10 Lakhs, Status: ***Completed***
- CO-PI of SERB funded CRG project titled “Development of advanced non-linear non-Gaussian state estimators with application to real-life problems”, Budget: 21 Lakhs, Status: ***Ongoing***
- CO-PI of FIST Project funded by DST, Budget: 88 Lakhs, Status: ***Ongoing***

Ph.D. Thesis Supervised

S. No.	Thesis title	Status
1.	Advanced approaches in Re-entry trajectory design for Hypersonic vehicles	Submitted
2.	Mars entry guidance	Ongoing

M. Tech. Thesis Supervised

S. No.	Thesis title
1.	Modelling and control of wind farms
2.	Re-entry trajectory optimization of a Spacecraft using Search Space Reduction Technique
3.	Azimuth position control of a deep space antenna
4.	Path planning of autonomous wheeled mobile robot
5.	Re-entry trajectory tracking of a Spacecraft using Linear Quadratic Regulator (LQR)
6.	Advanced control strategies for azimuth position control of a deep space antenna
7.	Re-entry trajectory design using Chebyshev-Lobatto collocation and Piecewise Cubic Hermite interpolating polynomial based control profiles
8.	Entry and powered descent guidance for Mars space lander
9.	Space Shuttle re-entry trajectory tracking using estimator based control
10.	Trajectory optimization of hypersonic glide vehicles using polynomial based direct method

B. Tech. Projects Supervised: 05

Short term courses organized

1. Coordinator for TEQIP-III sponsored one week short term course on Control of Power Electronics Converters for On grid and Off grid Applications organized at SVNIT Surat, during 03 – 07 August, 2020.
2. Coordinator for TEQIP-III sponsored one week short term course on Advances in Control Systems Engineering and Applications organized at SVNIT Surat, during 23 – 27 September, 2020.
3. Coordinator for TEQIP-III sponsored one week short term course on Advances in Control Systems Engineering and Applications organized at SVNIT Surat, during 24 – 28 February, 2021.
4. Coordinator of two days' Workshop on Control & Automation: Recent trends and Future organized at SVNIT Surat, during 12 – 13 February, 2022.

Achievements and other activities

- Received Gold Medal for being the best graduating student in M. Tech (Control Systems) from NIT Kurukshetra.
- Teaching assistant for various courses in IIT Bombay during the period 2014-2018.
- Google scholar link: Gangireddy Sushnigdha - Google Scholar.

Academic / Administrative Responsibilities

- Member of Internal Complaints Committee (ICC) from Jan 2021- Jan 2023
- Member of Institute Website Committee
- Member of Day Care Centre for Children (DCCC) committee
- Co-Chairman of Electrical Engineering Society
- Member of Departmental Newsletter and website committee

Membership in Professional bodies

- IEEE Aerospace and Electronic Systems Society
- IEEE Control Systems Society
- IEEE Robotics and Automation Society