

Deep Parikh

E-402, Pramukh Elysium, Gandhinagar, GJ, India, 382421.

E-mail: parikh.deep9301@gmail.com, dparikh@mathworks.com

LinkedIn : <https://www.linkedin.com/in/parikhdeepj/>

RESEARCH INTERESTS

Space systems design and development, On-orbit servicing, Active debris removal, Mission planning and optimization, Trajectory design, Proximity operations

EDUCATION

Master of Technology, Aerospace Engineering

CPI: 10/10. Class rank – 1st, May 2019

Indian Institute of Technology Kanpur. Kanpur, UP, India.

Specialization: Flight Mechanics and Control.

Bachelor of Technology, Instrumentation and Control Engineering PPI:8.84/10, Class rank – 1st, June 2014

Institute of Technology, Nirma University. Ahmedabad, GJ, India.

RESEARCH EXPERIENCE

Indian Institute of Technology Kanpur. Kanpur, U.P.

Orbital Stability and Optimal Landing Strategy on a Uniformly Rotating Homogeneous Rectangular Parallelepiped

Jan 18 – May 19

M.Tech Thesis. Supervisor: [Dr. Ashish Tewari](#).

- Derived gravitational potential using closed-form equations as well as spherical-harmonic expansion
- Utilized an iterative predictor-corrector technique to compute family of periodic orbits
- Transformed optimal landing problem into a two-point boundary value problem, with additional path constraints to avoid a collision with a central body, by an application of Euler-Lagrange equations
- The boundary value problem is solved using a collocation algorithm, and non-linear programming

Fixed time and finite time energy optimized landing trajectories for quadrotor vehicle in constrained 3-D environment

May 18

Supervisor: [Dr. Mangal Kothari](#).

- Formulated two-point boundary value problem for control affine quadcopter plant
- Utilized Sequential Quadratic Programming method to calculate fixed time and finite time energy optimized landing trajectories for quadrotor vehicle

Institute of Technology, Nirma University. Ahmedabad, Gujarat.

Development of the controller for Quadrotor UAV

Jan – May 14

Minor research project. Supervisors: [Dr. Jignesh B Patel](#) & [Dr. Jayesh Barve](#)

- Developed attitude estimation and control algorithm and verified using self-balancing robot
- Designed and fabricated 3-DOF static test bench to validate attitude stabilization for quadrotor UAV
- Built an experimental setup to characterize non-linearity of propulsion system

PUBLICATIONS

- Parikh, D., Tewari, A. Optimal Landing Strategy on a Uniformly Rotating Homogeneous Rectangular Parallelepiped. J Astronaut Sci 68, 120–149 (2021). <https://doi.org/10.1007/s40295-020-00243-y>
- Parikh, D., Patel, J., & Barve, J., Quad-copter UAV BLDC Motor Control: Linear v/s non-linear control maps. Nirma University Journal of Engineering and Technology, 4(1), 25. 2015.

TECHNICAL PROJECTS

Intelligent Ground Control Vehicle, IIT Kanpur

Sep 17 – June 18

Technical Mentor, GNC

- Enhanced localization accuracy of ground-rover with onboard LIDAR, IMU, cameras and RTK GPS
- Devised procedure to fuse 3DR pixHawk autopilot and shaft encoder odometry data, for GPS way point navigation and motion planning of the ground-rover

Team Robocon, Nirma University

April 12 – March 13

GNC Lead, robot 1

- Implemented dead reckoning odometry algorithm with sensor fusion of rotary wheel encoders and IMU
- Designed and validated motion planning, control, and waypoint navigation with uncertainty correction using feature points, for ground rover

WORK EXPERIENCE

Robotics and UAV Developer, MathWorks India.

July 19 – Present

- Enabling complete model-based design workflow, from MATLAB Simulation to automatic code-generation and deployment on Linux targets, for applications involving collaborate robots such as Kinova Gen3, Universal Robots UR5, ABB IRB1200, Franka Emika Panda etc for [Robotics System Toolbox™ Support Package for Manipulators](#)
- Devised engineering demos for [UAV Toolbox Support Package for PX4 Autopilots](#) to demonstrate attitude and position control, waypoint following and position tracking of UAVs using cascaded loops
- Serving as consultant for large scale design reviews to enable complete model-based design workflows, including pure simulation, SIL, PIL and, HIL simulations, for aerial platforms

Graduate Teaching Assistant, [Design of Fixed Wing UAV](#). NPTEL, Online course.

Aug 18 – Mar 19

Course Instructor: [Dr. Subrahmanyam Saderla](#).

- Assisted in preparation of course content, assignments, various simulations & examples used during the course by the instructor
- Actively interacted with registered students to resolve their queries on course discussion forum

Instrumentation & Control Engineer, Gujarat State Fertilizers & Chemicals Limited.

Aug 14 – Aug 17

- Gained working knowledge of pneumatic control systems, pneumatic to electronic control loop conversion, industrial sensors and their selection criteria based on application
- Led upgradation projects to replace old relay contactor-based control systems with latest PLC system
- Individually executed regular maintenance, major modifications for planned shutdowns and breakdowns, inventory and spare management for modern chemical plants with Distributed Control Systems (DCS) and Emergency Shutdown Systems (ESD) with Triple Module Redundancy (TMR)

HONORS & AWARDS

- Academic Excellence Awards for the year 2017, and 2018, Indian Institute of Technology Kanpur.
- Departmental Gold medal, Instrumentation and Control Engineering batch 2014, Nirma University.

CERTIFICATION

AGI Systems Tool Kit Certification Level-1 and Level-2. (of total 3 Levels)

Aug 2018

RELEVANT COURSE WORK

Analysis of Hoverslam Landing of Falcon 9 First Stage (AE647A – Flight Dynamics)

- Prepared a detailed analysis of final phase of Falcon 9 flight including the propulsive landing burn and presented effects of various parameters like burn start time, engine performance and residual mass.

Derivation of Dynamic derivatives from Wind Tunnel Tests (AE648A – Flight Stability and Control)

- Developed an algorithm to calculate dynamic derivatives for guided projectile from wind tunnel test data and analyzed natural and controlled trajectories for various fin deflection, initial velocity and height.