

Pradyumna Paruchuri

✉ pradyumnaparuchuri@gmail.com
www.sc.iitb.ac.in/~pradyumna

Education

- 2017–
Ongoing **Ph.D., Systems and Control Engineering, Indian Institute of Technology Bombay.**
- 2012–2017 **B.Tech. + M.Tech., Aerospace Engineering, Indian Institute of Technology Bombay, CGPA: 8.37/10.**

Publications

Journals

- S. Sarkar, P. Paruchuri and N. Khaneja, “Nonlinear chirp sequence for broadband π rotation using hyperbolic secant pulse,” *Applied Magnetic Resonance*, 2023.
- P. Paruchuri, D. Chatterjee, “Attaining the Chebyshev bound for optimal learning: a numerical algorithm,” *Systems & Control Letters*, Vol. 181, 2023.
- P. Paruchuri, S. Kotpalliwar, K. S. Phogat, D. Chatterjee and R. Banavar, “A frequency-constrained geometric Pontryagin maximum principle on matrix Lie groups,” *International Journal of Robust and Nonlinear Control*, Vol. 30, No. 15, pp. 6281–6297, 2020.
- S. Kotpalliwar, P. Paruchuri, D. Chatterjee and R. Banavar, “Optimal control with frequency constraints for non-smooth data,” *Automatica*, Vol. 107, pp. 493–501, 2019.
- P. Paruchuri and D. Chatterjee, “Discrete time Pontryagin maximum principle for optimal control problems under state-action-frequency constraints,” *IEEE Transactions on Automatic Control*, Vol. 64, No. 10, pp. 4202–4208, 2019.

Conferences

- S. Sarkar, P. Paruchuri and N. Khaneja, “Error analysis of rotating wave approximation in control of spins in nuclear magnetic resonance spectroscopy,” to be presented at the *60th IEEE Conference on Decision and Control (CDC)*, 2021.
- S. Kotpalliwar, P. Paruchuri, K. S. Phogat, D. Chatterjee and R. Banavar, “A frequency-constrained geometric Pontryagin maximum principle on matrix Lie groups,” presented at the *57th IEEE Conference on Decision and Control (CDC)*, 2018.

M.Tech. Thesis

- Title** Discrete time Pontryagin maximum principle for optimal control problems under state-action-frequency constraints
- Guides** Prof. Debasish Chatterjee and Prof. Arnab Maity
- Description** Established a Pontryagin maximum principle for discrete time optimal control problems incorporating
- constraints on the state and control actions, pointwise in time
 - constraints on the frequency spectrum of the control trajectories

Internship (May – July '15)

- Project** Autonomy for unmanned vehicles: Situational awareness and decision making under uncertainty
- Advisors** Prof. Paul Chung, Dr. Qinggang Meng, Loughborough University, UK
- Description** Developed a decision matrix that enables the UAV to respond proactively to adverse situations
- Created taxonomies of causes of potential hazardous situations encountered by UAVs and studied their propagation methodology
 - Analysed decision support algorithms using a hierarchical architecture and adapted them for

Computer Skills

Languages C++, Java, Python, Bash, SQL
Software MATLAB and Simulink, L^AT_EX

Technical Projects

Engine Design Cycle Optimization || *Guide: Prof. Bhaskar Roy*

- Optimized the engine cycle for given mission requirements of *thrust*, *TSFC* based on thermodynamic analysis
- Identified the engine parameter sensitivities for *mixed* and *unmixed flow turbofan engines*

Online Transaction Interface || *Guide: Prof. Nandlal L. Sarda*

- Designed and built an interface for online banking using HTML and Java
- Used *ER model* for the database design and *JDBC architecture* for implementing the interface

Uphill Cycling Assist || *Guide: Prof. Rajkumar Pant, Prof. Prabhu Ramachandran*

- Designed a device that stores part of kinetic energy of a cycle and uses it to assist the rider
- Used *Quality Function Deployment* and *Pugh Matrix* for decoding the product specifications and implemented a systematic design procedure to arrive at a working prototype

Miscellaneous

- Built a remote controlled car operating on radio frequency
- Built a line following robot in a team of 3 for an intra college event
- Programmed a solver for the game of Minesweeper