D Bhanu Prakash

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Experience

Research Fellow - NBHM Research Project **Oct 2021 – Sep 2024**

Project funded by Department of Atomic Energy-National Board of Higher Mathematics (DAE-NBHM), Government of India.

- Project Title: *"Time Optimal Control Studies and Bifurcation Analysis of Coupled Nonlinear Dynamical Systems with Applications to Pest Management"*
- Prestigious stipendiary Research Fellowship for three years, awarded on the basis of outstanding track record and research plans.
- Two Journal papers are published and four papers are communicated. Delivered 2 talks in international conferences organised by IIT Mandi and IIT BHU.

Education

PhD., Mathematics **Mar 2021 – Ongoing (Est Graduation, Apr 2025)**

Sri Sathya Sai Institute of Higher Learning (SSSIHL) *Prasanthi Nilayam - 515 134, India.*

- Thesis Title: *"Deterministic and Stochastic Time Optimal Control Studies and Bifurcation Analysis of Coupled Nonlinear Dynamical Systems with Applications to Pest Management"*.
- Research Supervisor: Dr. Krishna Kiran Vamsi Dasu

M.Sc. Mathematics specialization in Computer Science **2018–2020**

Sri Sathya Sai Institute of Higher Learning (SSSIHL); GPA: 8.3/10 Prasanthi Nilayam - 515 134, India.

B.Sc. Mathematics (Hons.) specialization in Computer Science **2015–2018**

Sri Sathya Sai Institute of Higher Learning (SSSIHL); GPA: 7.5/10 Prasanthi Nilayam - 515 134, India.

Certifications

Data Analysis with R Specialization by Duke University offered through Coursera **Mar 2025**

- Introduction to Probability and Data with R • Inferential Statistics
- Linear Regression and Modeling • Bayesian Statistics (Certificate)

Stochastic Processes by HSE University and offered through Coursera (Certificate) **Oct 2024**

Projects

Risk Assessment of Cyberattacks Using Bayesian Networks **Link - Jan 2025**

- Designed and implemented a Bayesian Network model to assess the probabilistic risk of successful cyberattacks on network assets using real-world cybersecurity data.
- Analyzed pre-processed datasets to identify relationships between vulnerabilities, threat actors, attack vectors, and asset exploitation probabilities.
- Computed risk levels for various assets and developed a ranked list with actionable mitigation insights.
- Delivered data-driven strategies for prioritizing cybersecurity defenses.

Numerical Simulation of a Two-Stage Rocket **Link - Dec 2024**

- This project simulates the vertical flight of a two-stage rocket by solving a **system of ordinary differential equations (ODEs)** numerically using scipy.integrate.solve_ivp with the RK45 method. The simulation accounts for quadratic air drag and gravitational forces but does not include parachute deployment during descent.

Selected Publications

- **D. B. Prakash** and D. Vamsi, "Stochastic time-optimal control and sensitivity studies for additional food provided prey-predator systems involving holling type-iv functional response," *Frontiers in Applied Mathematics and Statistics*, vol. 9, p. 1 122 107, 2023. [Online]. Available: https://doi.org/10.3389/fams.2023.1122107
- B. Chhetri, V. M. Bhagat, D. K. K. Vamsi, V. S. Ananth, **D. B. Prakash**, S. Muthusamy, P. Deshmukh, and C. B. Sanjeevi, "Optimal drug regimen and combined drug therapy and its efficacy in the treatment of covid-19: A within-host modeling study," *Acta Biotheoretica*, vol. 70, no. 2, pp. 1–28, 2022. [Online]. Available: https://doi.org/10.1007/s10441-022-09440-8
- B. Chhetri, V. M. Bhagat, D. K. K. Vamsi, V. S. Ananth, **D. B. Prakash**, R. Mandale, S. Muthusamy, and C. B. Sanjeevi, "Within-host mathematical modeling on crucial inflammatory mediators and drug interventions in covid-19 identifies combination therapy to be most effective and optimal," *Alexandria Engineering Journal*, vol. 60, no. 2, pp. 2491–2512, 2021. [Online]. Available: https://doi.org/10.1016/j.aej.2020.12.011

Honors and Awards

- APSET 2021 - **Qualified** in Mathematics
- AP EAMCET 2015 - **Rank 1939**
- TS EAMCET 2015 - **Rank 2048**
- IIT JEE Main 2015 - **Rank 17003**

Technical Skills

Programming	Python, R, MATLAB, C, C++
Frameworks	Numpy, Sympy, Matplotlib, Pandas, Scipy
Misc	Git, LaTeX, Google Colab, Jupyter Notebook, MS Office
OS	Ubuntu, macOS, Windows