



Module PMRF-ISSS006/2023

# Applied Nonlinear Control

## Name of the PMRF student

Ratnangshu Das

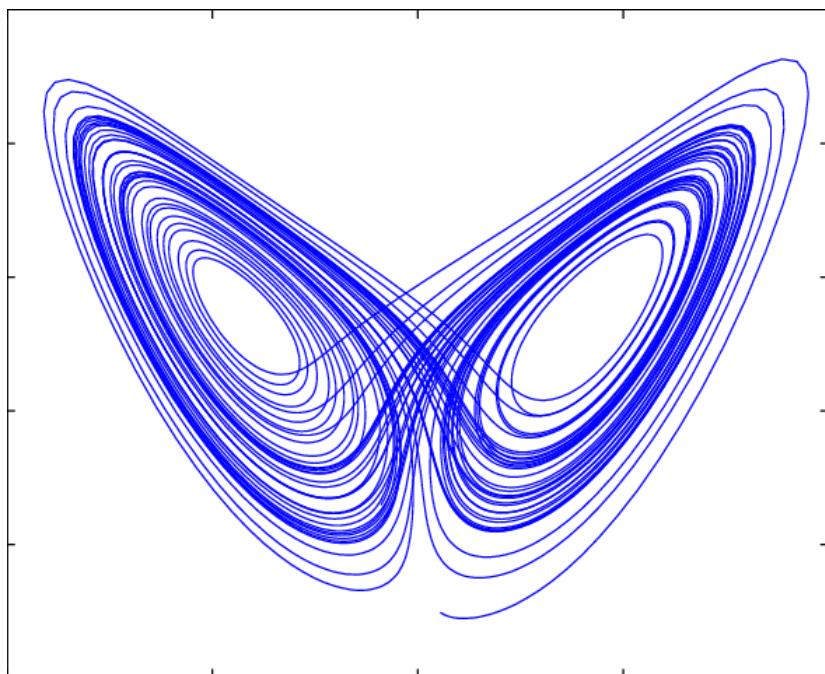
## Required background of the students taught

Introductory level course for students of ME, EE, AE, particularly interested in robotics

Prerequisites: Programming in Matlab, Linear Algebra, Calculus.

## Online session coordinator

Will be chosen from the list of registrants



## Details of the content of the module

### Part1: Analysis of Nonlinear Systems:

Week 1: Introduction to Nonlinear Systems: Nonlinear Phenomenon, Equilibrium Points, Phase Portraits

Week 2-3: Mathematical Background for Non-Linear Systems: Existence and Uniqueness of Solutions, Comparison Lemma

Week 3-6: Stability and Safety Properties: Lyapunov Stability, Invariance Principle, Comparison Functions, Input-to-State-Stability

### Part 2: Applied Nonlinear Control

Week 7-9: Lyapunov-based Feedback Design: Control Lyapunov Func, Model-Ref. Adaptive Control, Backstepping, Control Barrier Func

Week 10-11: Other Control Techniques: Feedback Linearization, MPC, etc.

Week 12: Simulation of Nonlinear control systems, Phase space visualization, etc.

## Schedule of the module

Start Date: 02 May, 2023

Live lectures will be conducted (or recorded lectures might be uploaded) on Tuesdays and Fridays at 10:30 am to 12:30 pm (25-26 Lectures)

End Date: Tentatively by end of July'23

Meeting link : Will be shared later

[Link](#)

Contact email ID: [issf.forum@gmail.com](mailto:issf.forum@gmail.com)

Registration

link: <https://forms.office.com/r/bbR9c67cmG>