EL8223: Applied Nonlinear Control

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Office Hours: See website
Course Website: http://crrl.poly.edu/8223

Course Outline

1: Motivation, examples, linearization, and Lie derivatives.

2,3: Lie Algebra and Lie bracket (and properties), vector fields, distributions, diffeomorphisms, and examples.

4: Frobenius Theorem and applications.

5,6: Local decomposition of control systems: review of Kalman decomposition, controllability and observability Lie Algebras, and local decompositions.

7: Relative degree, input-output linearization, zero dynamics, minimum and non-minimum phase.

8: Midterm.

9,10: Exact feedback linearization, stabilization, and examples.

11: Asymptotic output tracking, disturbance decoupling, model matching, canonical forms, and observers.

12: Lyapunov stability, control Lyapunov functions (CLF), advanced stability analysis, and passivity.

13: Input-state stability (ISS) and small gain results.

14: Backstepping and variations.

15: Final.

References:
1. Lecture notes on the course website.

Grading:
Midterm: 35% , Final: 40% , Homework: 10% , Project - 15%