

Nonlinear Control Theory

(MEM 636, 637)

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Text Books & Software:

Kwatny, H. G. and Blankenship, "Nonlinear Control & Analytical Mechanics," Birkhauser, 2000

Other References

1. Friedland, Bernard, "Advanced Control System Design", Prentice-Hall, Inc., 1996.
2. Slotine, J-J. E. and Li, W., "Applied Nonlinear Control," Prentice-Hall, 1991.
3. Vidyasagar, M., "Nonlinear Systems Analysis 2nd edition," Prentice-Hall, 1993.
4. Isidori, Alberto, "Nonlinear Control Systems-3rd edition," Springer-Verlag, 1995.
5. Nijmeijer, H. and H. J. van der Schaft, 1990: *Nonlinear Dynamical Control Systems*. Springer-Verlag.
6. Khalil, H. K., 1996: *Nonlinear Systems-2nd edition*. MacMillan.

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1. Introduction
2. Nonlinear Dynamical Systems
3. Lyapunov Stability
4. Manifolds, Vector Fields & Flows
5. Distributions & Frobenius Theorem
6. Distributions & Frobenius Theorem, Cont'd
7. Controllability
8. Control via Feedback Linearization
9. Robust Control & Adaptive FBL Control
10. Observability Observer Design

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1. Discontinuous Systems
2. Variable Structure Control
3. Variable Structure Control, Cont'd
4. VSC Mechanical Systems
5. VSC Electro-Mechanical Systems
6. VSC Regulation
7. Hybrid Systems Introduction
8. Hybrid Systems Design
9. HS Examples
10. Aircraft landing Safety

Assignments:

1. MEM 637 Project 1; due Tuesday, Feb 16, 2021
2. MEM 637 Project 2; due Friday, March 12, 2021