CALIFORNIA INSTITUTE OF TECHNOLOGY
Control and Dynamical Systems

CDS 270: Adaptive Control

Spring 2013

Instructor

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Office Hours: Fridays, by appointment

Grading

Pass / Fail.

Prerequisites

Linear systems and control, basic understanding of nonlinear dynamics, Lyapunov stability theory, numerical methods, MATLAB.

Course Outline

The main goal of this course is to give a self-contained mathematical treatment of robust adaptive control theory and its current state of the art. Aerospace applications of adaptive flight control will be discussed. We will cover Part II, chapters 7 through 14 of the course textbook [1]. Homework will be assigned once a week. Mid-term and Final exams (in class) will be given.

Course material

The following is a tentative outline of the material to be covered.

Part II Robust Adaptive Control

Course Textbook:

1. E. Lavretsky, K.A. Wise, *Robust and Adaptive Control With Aerospace Applications*, Advanced Textbooks in Control and Signal Processing, Springer-Verlag, London, ISBN: 978-1-4471-4395-6 (Print), 978-1-4471-4396-3 (Online), 2013.

Supplementary Textbooks

1. P. Ioannou, B. Fidan, *Adaptive Control Tutorial*, SIAM, Advances in Design and control, SIAM, PA, 2006.
2. K. Narendra, A. Annaswamy, *Stable Adaptive Control*, Dover, N.Y., 2005.
3. H.K. Khalil, *Nonlinear Systems*, 3rd Edition, Prentice Hall, New Jersey, 2002.
4. J.J. Slotine, W. Li, *Applied Nonlinear Control*, Prentice Hall, 1995.
5. M. Krstic, I. Kanellakopoulos, P. Kokotovic, *Nonlinear and Adaptive Control Design*, John Wiley & Sons, New York, 1995.
6. R.Marino, P.Tomei, *Nonlinear Control Design: Geometric, Adaptive, Robust*, Prentice Hall, New Jersey, 1995.
7. S.S. Sastry, M. Bodson, *Adaptive Control: Stability, Convergence and Robustness*, Prentice Hall, 1989.