

# CALIFORNIA INSTITUTE OF TECHNOLOGY

## Control and Dynamical Systems CDS 243: Robust, Optimal and Adaptive Control

### Instructor

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Office Hours: By appointment.

### Grading

Letter.

### Prerequisites

Basic understanding of linear systems theory, nonlinear dynamics, and control methods. Ability to simulate dynamical systems in MATLAB.

### Course Outline

The main goal of this course is to present a set of robust, optimal, and adaptive control concepts, their solutions and theoretical challenges for dynamical systems with incomplete measurements and uncertainties. Aerospace applications are discussed. The course material covers selected chapters from the course textbook [1]. Homework is assigned once a week. Mid-term and Final exams will be given.

### Grading

Attendance	5%
Homework	40%
Midterm	25%
Final	30%

### 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. H.K. Khalil, *Nonlinear Systems*, 3<sup>rd</sup> Edition, Prentice Hall, New Jersey, 2002.
2. B.D.O. Anderson, J.B. Moore, *Optimal Control, Linear Quadratic Methods*, Dover, Mineola, New York, 1990.
3. K.J. Åström, R. M. Murray, *Feedback Systems: An Introduction for Scientists and Engineers*, Princeton University Press, 2008.
4. B.L. Stevens, F.L. Lewis, *Aircraft Control and Simulation*, John Wiley & Sons, Inc., 1992.