Goals:
• Provide an overview of the course contents
• Review course administration (homework, grading, collaboration, schedule)

Reading:
• Course syllabus (handout)
Modern Control System Design

Traditional Control System: controller + process
• Corresponds to “inner loop” of most control system designs

Modern Control System: optimization-based design + robust analysis
• Replace reference with reference trajectory (Weeks 1-3)
• Replace process output with estimated output (Weeks 3-6)
• Replace “inner loop” controller with robust controller (Weeks 6-10)
Course Administration

Course Texts

Grading
• Homework: 50% - weekly sets, first set out today
• Midterm: 20% - open book, will cover optimal control + random processes
• Final: 30% - open book, out the last day of class, due the last day of finals

Collaboration: encouraged!
• Write up your own solutions, *including MATLAB scripts and plots*
• No collaboration on midterm or final
Optional Course Project

Control System *Implementation*

- Course work focuses on design techniques, analysis, simulation
- Project will focus on implementation of controllers on Alice
- SURF opportunities available building on project experience (see SURF web page)

Project administration

- Project reports (written and oral) in lieu of midterm and final
- Attend optional lectures on control system implementation (first 3 weeks)
- Total time required for implementation: about 30-40 hours (over 10 weeks)
- Selected homework problems are aligned with project schedule

**Project information meeting:** Friday, 2-3 pm, 125 Steele
CDS Course Structure

CDS 110a – Analytical understanding of key concepts in control
• Detailed description of classical control and state space concepts
• Provide knowledge to work with control engineers in a team setting

CDS 110b – Detailed design tools for control systems
• Estimation and robust control tools for synthesis of control laws

CDS 111 – Implementation of control systems for engineering applications

CDS Minor
• Undergrad: CDS 110ab, CDS 104 or 140, senior thesis
• Grad: 54 units in CDS (typically CDS 110ab, CDS 140ab, CDS 212/213)
• CDS 104 (Intro concepts in dynamical systems): offered third term
• CDS 140 (Introduction to dynamics): offered first term

Spring: CDS 270 (networked control systems), CDS 273 (frontiers in CDS)
Additional Details

TAs
- James Martin, Shaunak Sen
- Jeremy Gillula (lab TA)

Office hours
- TAs: TBD
- Instructor: Fridays, 4-5 pm, 109 Steele

Course web page
- http://www.cds.caltech.edu/~murray/cds110b

Course signup sheet
- Please fill in name and e-mail; we be used to create mailing list for course

Course scheduling sheet
- Will be used to determine office hours + possible change in lectures