

ASE 170p – Controls Lab

Instructor: Eduardo Gildin
Classes: TH 6:30 – 9:30 pm
Location: WRW 113/ WRW 405

2/27/2004 ASE170p - Controls Lab 1

Today's Topic

- Introduction
 - Objectives
 - What you are (aren't) going to learn
 - Lectures and Labs
- Control's Review
- Lab Tour and Demo
- Groups Assignment

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Objectives

- Introduce the student to the fundamentals of control systems theory with emphasis on design and implementation,
- integrate key ethics and leadership cases => understand the role of aerospace technology in a global context.
- Hands-on experience with controls systems

Learn:

- Modeling for control purposes => Review on Dynamics
- basic issues on the trade-off between design and implementation => basic on digital control
- LabVIEW



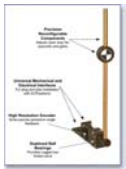
Out of Scope::

- Digital Control
- Advanced LabVIEW
- Dynamics
- Electronics
- Advanced Control Issues

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Controls Lab I

- Comprises of 2 sets of equipment + Inverted Pendulum Accessory
 - Rectilinear Mass Spring Damper
 - Torsional Systems

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Controls Lab II

- How they are implemented? ⇒ two ways:
 - Using the ECP hardware and software ⇒ closed architecture
 - Using NI Equipment + LabVIEW RT ⇒ Open architecture

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Topics/Schedule

01/22	Course Introduction + Review of Classical and Modern Control Systems
01/29	Introduction to LabVIEW I
02/05	Ethics in Engineering Design Lecture + LabVIEW II
02/12	Introduction to Digital Control Systems
02/19	Plant Identification using the Rectilinear Control System
02/26	Rigid Body PD & PID Control using the Rectilinear Control System
03/04	Collocated PD Control with 2 DOF – Rectilinear Control System
03/11	Plant Identification - Torsional Disks
03/18	Spring Break – no class
03/25	Torsional Control System - Design of a PID control
04/01	Torsional Control System - Design of Phase Lead- Lag Compensator
04/08	Inverted Pendulum Control System – Rectilinear Plant
04/15	Self-Erecting Inverted Pendulum Control System – Rectilinear Plant
04/22	Self-Erecting Inverted Pendulum Control System – Torsional Plant
04/29	Leadership in Aerospace Lecture + Review + Evaluation
05/06	Final Quiz

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Controls Review + Demos...

- Quick Review on
 - Laplace Transforms
 - Transfer Functions
 - Time Response
 - Design Methods
 - Root Locus
 - Frequency response – Bode + Nyquist

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