16.06
Principles of Automatic Control

- Automatic (feedback) controls are the basis for virtually all aircraft and spacecraft flight control and guidance systems
- Without feedback controls many modern aerospace vehicles cannot be flown by humans
- All unoccupied aerospace vehicles (e.g. UAVs, deep space probes) are controlled and guided by feedback controls, with high level supervision by humans

Teaching Staff

Faculty

Prof. Karen Willcox

Prof. John Deyst

Graduate Teaching Assistant

Farmey Joseph

Undergraduate Teaching Assistants

Julie Arnold

Timothee De Mierry

Paula Echeverri

Brief Course Outline

- Linear systems analysis using Laplace Transforms (Willcox, 4 weeks)
- Lab 1
- State space methods (Deyst, 3 weeks)
- Quiz 1
- Analysis and design in the time domain using root locus (Willcox, 2 weeks)
- Lab 2

Brief Course Outline (cont.)

- Analysis and design in the frequency domain using Nyquist methods (Deyst, 4 weeks)
- Quiz 2
- Analysis and design in the frequency domain using Bode methods (Willcox, 2 weeks)
- Final Exam

Course Objectives

Give students-

- a basic understanding of feedback control systems theory
- the ability to perform analysis and design of linear feedback control systems
- hands on experience analysing and designing controls for an aerospace-like laboratory system

Measurable Outcomes

Demonstrate the-

- ability to explain typical feedback control system operation
- ability to apply linearization techniques
- utilization of the duality of time and frequency domain performance specifications to design linear compensators for closed loop systems

Evaluation Methods

- Weekly homework assignments-25%
- Two laboratory assignments-15%
- Two quizzes-30%
- Final exam-25%
- Personal assessments by teaching staff-5%