EEL 5654 Control Systems 2

Credits: 3 credits

Textbook, Title, Author, and Year: Katsuhiko Ogata, "Modern Control Engineering", Fifth Edition, Prentice Hall 2009.

Reference Materials: N/A

Specific Course Information

Catalog Description: This is a second course in Control Systems covering more advanced topics from Digital Control, Nonlinear Systems and Control and Control Instrumentation.

Prerequisites: EEL 4652 Control Systems 1; Course is typically taken at the Senior year or at the graduate level in Electrical Engineering

Specific Goals for the Course:

- Understanding how to implement controllers digitally
- Understanding how to analyze and simulate control systems that suffer from nonlinearities
- Learn about advanced nonlinear control design methods
- Understanding more in-depth actuators (such as DC motors) and how to select them for a given application
- Learn in more depth how to model complex control systems (such as aircrafts and robots), using Lagrange equations

Brief List of Topics to be covered:

1. Course Syllabus; Review of basic concepts covered in Control Systems 1 – transfer functions, stability and transient response
2. Review of basic concepts from Control Systems 1 – controller design techniques
3. Controller digital implementation; The Z Transform and properties
4. Digital Control basics: Stability in the Z plane, Sampling and Hold
5. Digital Control: Discretizing of control processes; Simulation techniques using Simulink.
6. Nonlinear models; Classification of Equilibrium Points; Linearization.
7. Modeling Piecewise Linear Nonlinear Systems; Servo models with saturation, backlash and dead-zone nonlinearities