# ME451: Control Systems

**Lecture 14**
**Review of Topics for**
**Midterm #1**

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## Topics Covered

- Through Homework due 2-17-10
- Chapters 1, 2.1-2.3, 2.5-2.14, and 4.1-4.3



## Topics Covered

- Chapter 1 Introduction
  - 1.1 The Control Problem
  - 1.2 Examples of Control Systems
  - 1.3 Short History of Control
  - Block Diagram Modeling homework assigned



## Topics Covered

- Chapter 2: Models of Physical Systems
  - 2.1 System Modeling
  - 2.2 Electrical Circuits
  - 2.3 Block Diagrams (and Signal Flow Graphs)
  - 2.5 Mechanical Translational Systems
  - 2.6 Mechanical Rotational Systems
  - 2.7 Electromechanical Systems
  - 2.8 Sensors
  - 2.9 Temperature-control System
  - 2.10 Analogous Systems
  - 2.11 Transformers and Gears
  - 2.12 Robotic Control System
  - 2.13 System Identification
  - 2.14 *Linearization*

## Topics Covered

- Chapter 2 Homework Topics
  - 2.1, 2.2: Circuit Analysis
  - 2.3, 2.6: Op-Amp Circuit analysis
  - 2.14, 2.15, 2.18: Mechanical Translation & Rotation
  - 2.22: Block Diagram Analysis to find TF
  - 2.23 & Handout: Linearization

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## Topics Covered

- Chapter 4: System Responses
  - Time Response of First-Order Systems
  - Time Response of Second-Order Systems
  - Time Response Specifications in Design
  - Frequency Response of Systems

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## Topics Covered

- Chapter 4 Homework Topics
  - 4.1, 4.2: 1st Order Step Response Parameters
  - 4.3: 1st & 2nd Order Step Response Parameters
  - 4.4, 4.5: Closed-Loop 2nd Order Response and Design
  - 4.13, 4.14, 4.15, 4.16, 4.18, 4.19:
    Closed-Loop System Design to specifications,
    Allowable pole locations,
    Matlab analysis

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