

UNIVERSITY OF WASHINGTON
Department of Electrical Engineering

EE 446 Control System Analysis I

Summer 1996, 4 credits

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Teaching Assistant: Shinhak Lee, EEB 215. Tel: (206) 616-1773, E-mail: sherman@ee.washington.edu. Office hours: MW: 1:00-2:30 pm.

Objectives:

- To provide students with a background in feedback control system design.
- To introduce students to linear system theory.
- To learn MATLAB's extensive linear systems analysis tools.

Textbook: J.J. D'Azzo and C.H. Houpis, *Linear Control System Analysis and Design*, 4th Edition, McGraw-Hill, 1995.

Course Outline: Material from Chapters 1-10 of the text will be covered in class. These include:

- Review of mathematical modeling of physical systems, differential equations and Laplace transforms.
- Transfer functions and feedback. State variable descriptions and solutions. Routh's stability analysis.
- Pole-zero methods of analysis, system types, error coefficients. Error coefficients as design parameters.
- Root locus methods for analysis and design.
- Cascade and feedback compensation by root locus methods. Design of compensators to meet performance specifications in time domain.
- Frequency domain methods. Nyquist stability analysis.
- Design of Cascade and feedback compensation networks using frequency domain methods.

Prerequisites: Basic understanding of differential equations, and Laplace transform analysis of linear circuits and systems.

Grading:

Homeworks	25%
Midterm	35%
Final	40%

Course Structure: The class meets for four lectures a week on Tuesdays and Thursdays. Homework will be assigned on Thursday of every week, and will be due at the beginning of class on the following Thursday. A number of MATLAB projects will also be assigned as homework.

References:

1. R. C. Dorf, *Modern control systems*, Addison-Wesley, 1995.
2. A. Papoulis, *Signal Analysis*. McGraw-Hill, 1977.
3. A. Grace et al., *Control system toolbox for use with MATLAB : user's guide*, MathWorks, 1992.
4. MATLAB Electronic Resources:
Web: <http://www.mathworks.com>, USENET: comp.soft-sys.matlab.