EE 352, Systems II
OSU, Winter 2008

January 4, 2008

Course Syllabus

Time and venue: MWF 3:30–4:18 pm, Baker Systems Engineering Building (BE) 285

Instructor: C. Emre Koksal, DL 712, koksal@ece.osu.edu

Web page: http://www.ece.osu.edu/∼koksal/EE352

Office Hours: Friday 4:30–7:30 pm or by appointment

Objectives:

(a) Teach fundamental concepts of continuous-time and discrete-time system theory

(b) Apply theory to engineering problems such as systems modeled with linear differential equations and linear difference equations.

(c) Teach time domain techniques (state variables for continuous and discrete-time systems) and frequency domain techniques (Laplace and z-transforms), emphasizing tools which can be implemented in analysis and design via the computer package Matlab.

(d) Illustrate applications in control and communication systems.

Prerequisites: Systems I (EE 351) and Introductory Circuits and Differential Equations (EE 301).

Homework assignments: Once every week (almost). Assigned on Mondays due the following Monday. Some questions will require the use of MATLAB. Since the primary purpose of the homeworks is to help you solidify your understanding of course material, discussions on assigned problems are encouraged. However, all written work turned in must be your own.

Text: Kamen and Heck, Fundamentals of Signals and Systems Using MATLAB, third edition, Prentice Hall, 2007.

Other References:

- Oppenheim and Willsky, Signals and Systems, Prentice-Hall, 1997.
- Siebert, Circuits Signals and Systems, MIT Press, 1986
- Haykin and Van Veen, Signals and Systems, Wiley, 1999.

Grading:

Midterm 1	25%
Midterm 2	25%
Final	35%
Homework	15%

Attendance: Attendance is not mandatory. However the student is responsible for all assignments, changes of assignments, announcements and other course related events, which occur in class.

Topical Outline of the Course

- Laplace Transforms (7 lectures)
  - Laplace transform and its properties (Ch. 6.1, 6.2)
  - Computation of inverse Laplace transform (Ch. 6.3)
  - Transform of input/output differential equations (Ch. 6.4)
  - Transform of input/output convolution integral (Ch. 6.5)
  - Transfer function (Ch. 6.6)
- Analysis of Continuous-Time Systems (5-6 lectures)
  - Stability (Ch. 8.1, 8.2)
  - Analysis of step response (Ch. 8.3)
  - Response to sinusoidal inputs (Ch. 8.4)
  - Frequency response function (Ch. 8.5)
  - Causal Filters (Ch. 8.6)
- Application to Control (2 lectures)
  - Introduction to control (Ch. 9.1)
  - Tracking control (Ch. 9.2)
- The z-Transform and Discrete-Time Systems (7-8 lectures)
  - z-transform, discrete-time systems and properties (Ch. 7.1, 7.2)
  - Inverse z-transform (Ch. 7.3)
  - Discrete-time transfer function (Ch. 7.4)
  - Discrete-time system analysis (Ch. 7.5)
- State Representation (5 lectures)
  - State model (Ch. 11.1, 11.2)
  - Continuous-time state equations and solutions (Ch. 11.3)
  - Discrete-time state models (Ch. 11.4)

Note: Ch. *.* refers to the section in Kamen & Heck.