6.003 Calendar (Fall 2007)

Overview of semester

- **Basic Representations of Discrete-Time Systems (4 weeks).** Difference equations, block diagrams, operator expressions, system functions, feedback and control, Z transforms, convolution (O&W Chapters 1, 2, 10, 11)

- **Basic Representations of Continuous-Time Systems (3 weeks).** Differential equations, block diagrams, operator expressions, system functions, feedback and control, Laplace transforms, convolution (O&W Chapters 1, 2, 9, 11)

- **Signal Processing (3 weeks).** Fourier Series, Fourier Transforms, Filtering (O&W Chapters 3, 4, 5, and 6).

- **Sampling (2 weeks).** Sampling, aliasing, DT processing of CT signals (O&W Chapter 7).

- **Communications (2 weeks).** Modulation, AM, FM (O&W Chapter 8).

First one-third of semester

R1   Tank Problem: Differential Equation, Euler Forward approximation, Difference Equation

L1   Introduction to Signals and Systems

R2   Examples of Discrete-Time Systems: bank acounts and population growth

L2   Multiple Representations of DT systems: difference equations, block diagrams, and the R operator

R3   Exercises with R: expand $(1 + R)^3$ using difference equations, block diagrams and polynomials

L3   Feedback, cyclic signal paths, and modes

R4   Examples of modes using second order difference equations

L4   Higher-order systems, poles and zeros, and the z-plane

R5   Examples of poles and zeros

L5   Hierarchical representations: System functions as building blocks, Black's equation

R6   Examples of system functions

L6   Demonstrations of control systems: Robot arm and mobile robot

R7   Analysis of robot arm or mobile robot

L7   Stabilizing unstable systems

R8   Examples of stabillity

L8   Root locus

R9   Examples of root locus

L9 Z transform

Q1   Quiz 1.