Discussion Section 2 Week of September 8 - September 14, 2005

Topics Differential/difference equations, convolution, impulse responses **Reading** OWN Chapter 2

Problem 1 (Graphical convolution.) OWN 2.23

Problem 2 (Impulse responses.) OWN 2.24

Problem 3 (Differential equations.)

A system is described by the following differential equation:

$$\frac{d^2}{dt^2}y(t) + 3\frac{d}{dt}y(t) + 2y(t) = x(t) + \frac{d}{dt}x(t)$$

- (a) Find the natural response of the system.
- (b) Find the forced response when the system is driven by $x(t) = e^{2t}u(t)$.

Problem 4 (Difference equations.)

A system is described by the following difference equation:

$$y[n] + y[n-2] = x[n] + 2x[n-2]$$

(a) Find the natural response of the system.

(b) Find the forced response when the system is driven by x[n] = u[n].