## 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:

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

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

Problem 4 (Difference equations.)
A system is described by the following difference equation:

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

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

