Homework No. 3
Due 11:10 am, April 7, 2005

1. Determine the homogeneous and particular solutions for the system described by the following differential equation for the given inputs and initial conditions:

$$\frac{d^2}{dt^2}y(t) + 4y(t) = 3\frac{d}{dt}x(t), \quad y(0^-) = -1, \quad \frac{d}{dt}y(t)\Big|_{t=0^-} = 1$$

   (a) $x(t) = t$

   (b) $x(t) = e^{-t}$

   (c) $x(t) = \cos(t) + \sin(t)$

2. Determine the homogeneous and particular solutions for the system described by the following difference equation for the given inputs and initial conditions:

$$y[n] - \frac{1}{4}y[n-1] - \frac{1}{8}y[n-2] = x[n] + x[n-1], \quad y[-1] = 1, \ y[-2] = 0$$

   (a) $x[n] = nu[n]$

   (b) $x[n] = \left(\frac{1}{8}\right)^n u[n]$

   (c) $x[n] = e^{j\frac{\pi}{4}n}u[n]$