HW # 7, Due November 25, 2008 at 11:30 AM

1. Find the DC gain of each of the following transfer functions. Show your work. (15 pts.)

$$g_1(s) = 1/(s+1),\ g_2(s) = 10/(s+1)(s+2),\ g_3(s) = (s+8)/(s+2)(s+4)$$

2a. Find the Bode plot of

$$g_4(s) = 2/(s+2)$$

(15 pts.)

2b. Using MATLAB, compute the magnitude gain and the phase shift of

$$g_4(s) = 2/(s+2)$$

at the following frequencies:

$$\omega = 1, 2 \text{ and } 10.$$

(15 pts.)

2c. Design a control law u(t) for this system so that the steady-state response to u will be $y_{ss}(t) = \sin(2t)$

(25 pts.)

3. Using MatLab, find the root-locus plots ot the following six systems:

$$g(s) = (s \pm 2)/(s^2 + .5s + 1)$$

$$g(s) = (s \pm 2)/(s^2 + 2s + 1)$$

$$g(s) = (s \pm 2)/(s^2 + 10s + 1)$$

(30 pts.)