

Homework 3**Out:** February 26, 2011.**Due:** Friday, March 4, 2011, **at 5 pm**, in the homework boxes outside Harold Frank Hall 3120.**Problem 1.** For the open loop system

$$G(s) = \frac{Y(s)}{U(s)} = \frac{64}{s^2 + 10s + 64}$$

- a) Find the discrete state-space representation assuming there is a ZOH and sampling time of $T=0.01$ sec.
- b) Find the full state digital feedback that provides equivalent s-plane poles at $\omega_n=30$ rad/s with $\zeta = 0.6$.
- c) Using MATLAB, plot the response of the closed-loop discrete-time system to an initial value of y and verify that the response is consistent with the desired poles.

Problem 2. Franklin, Powell, and Workman (FPW) 8.6.**Problem 3.** FPW 8.12.**Problem 4.** FPW 8.22.**Problem 5.** FPW 8.23.