ECE452/552

HW #5

Hand in your solutions by the start of class on Feb. 26.

Problem (4) is from Ogata, "Discrete-Time Control Systems" 2nd ed., page 292.

- 1) Obtain the discrete-time equivalent of the following continuous-time filter by the use of
 - (1) the backward difference method, and,
 - (2) the impulse-invariance method:

$$G(s) = \frac{2}{(s+1)(s+2)}$$

Assume that the sampling period is 0.1 sec, or T = 0.1.

2) Question 2 from the Midterm 2 practice exam:

Use the matched pole-zero mapping method to determine the equivalent discrete-time filter for the following:

$$G(s) = \frac{s+a}{s(s+b)}$$

- 3) For the above questions (1) and (2) use Matlab (using the 'bode' command) to compare the Bode plots of the continuous-time and discrete-time systems. For Question 2 use a = 1, b = 10 and sampling period, T = 0.2. So, for each of the three continuous-time and discrete-time frequency response pairs be sure to plot each pair on the same graph.
- 4) B-4-16 (from Ogata page 292)