ECE 461 - Homework #11

Discre-Time Compensator Design. Due Monday, November 23rd

Each problem is 20 points

The transfer function for a system is

$$G(s) = \left(\frac{625}{(s+1.31)(s+5.71)(s+12.45)(s+18.37)} \right)$$

(heat equation from Homework #5 and #10)

Assume a sampling rate of T = 0.1 second.

1) Design a discrete-time compensator of the form

$$K(z) = k$$

which results in

- 20% overshoot for a step input.

Check your design in VisSim

2) Design a discrete-time PI compensator of the form

$$K(z) = k\left(\frac{z-a}{z-1} \right)$$

which results in

- No error for a stp input and
- 20% overshoot for a step input.

Check your design in VisSim

3) Design a discrete-time compensator K(z) which results in

- No error for a stp input and
- 20% overshoot for a step input.
- A 2% settling time of 1 second

Check your design in VisSim

4) Write a program to implement the compensator for problem #3