

ECE 461 - Homework #9

Systems with delays, lightly damped poles, unstable poles. Due Monday, November 9th

20 points per problem

For each problem, design a compensator, $K(s)$, which results in

- No overshoot for a step input
- 20% overshoot for a step input, and
- A 2% settling time of 4 seconds

Verify your design in VisSim (or lime program)

1) System with a 200ms delay

$$G(s) = \left(\frac{20}{(s+1)(s+2)(s+5)} \right) \cdot e^{-0.2s}$$

2) Lightly damped system

$$G(s) = \left(\frac{20}{(s+1)(s+j2)(s-j2)} \right)$$

3) Unstable System

$$G(s) = \left(\frac{20}{(s-1)(s+2)(s+5)} \right)$$