ECE 461 - Homework Set #7

Root Locus an dGain Compensation - Due Monday, October 19th

Problem 1-4)

$$G(s) = \left(\frac{100}{(s+1)(s+4)(s+8)(s+9)} \right)$$

1) Sketch the root locus of G(s) including real axis loci, asymptotes, and jw rossing.

2) Determine the feedback gain, k, which results in 20% overshoot for a step input.

3) For this value of k, determine the closed-loop system's
   - Closed-loop dominant poles
   - Steady-state error for a step input

4) Check your design in VisSim or MATLAB

Problem 5-8)

$$G(s) = \left(\frac{100(s+6)}{(s-1)(s+5)(s+10)(s+12)} \right)$$

5) Sketch the root locus of G(s) including real axis loci, asymptotes, and jw rossing.

6) Determine the feedback gain, k, which results in 20% overshoot for a step input.

7) For this value of k, determine the closed-loop system's
   - Closed-loop dominant poles
   - Steady-state error for a step input

8) Check your design in VisSim or MATLAB

Problem 9-12)

$$G(s) = \left(\frac{10(s+1+j3)(s+1-j3)}{s(s+5)(s+10)} \right)$$

9) Sketch the root locus of G(s) including real axis loci, asymptotes, and approach angle to the zero at -1 + j3.

10) Determine the feedback gain, k, which results in 20% overshoot for a step input.

11) For this value of k, determine the closed-loop system's
   - Closed-loop dominant poles
   - Steady-state error for a step input

12) Check your design in VisSim or MATLAB