

**CDS 101/110: Homework #7**

(Due Monday, December 5, 2016)

**Problem 1 (CDS 101, CDS110):** (25 points)

Consider a plant with transfer function:

$$P(s) = \frac{20}{(s+1)(s+2)(s+3)}. \quad (1)$$

Your goal is to design a controller/compensator,  $C(s)$ , which satisfies the following requirements

- Steady state error of 2% or less.
- Overshoot of less than 20%.
- Less than 10% tracking error up to 8 radians/sec.
- 1.0 second settling time

**Part (a):** Design a compensator for this system with these specifications. The design could be a PID system, a lead or lag system, or some combination of all of these components.

**Part (b):** For your designed system, plot the sensitivity function.