Homework 10

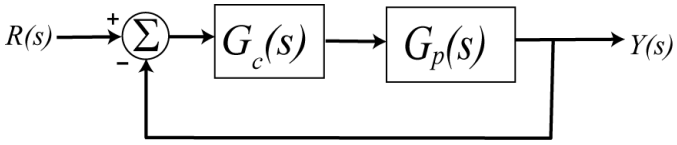
Steady State Frequency Response

This homework assignment is due Friday May 20 at 5 PM

Reading: Chapter 8 of Course Notes

Complete the following problems on engineering paper using the problem solving format and submit the assignment at the beginning of class.

1. Chapter 8, Problem 8.1 from the Course Notes
2. Chapter 8, Problem 8.2 from the Course Notes (get Bode plots from instructor)
3. Chapter 8, Problem 8.3 from the Course Notes
4. Chapter 8, Problem 8.4 from the Course Notes
5. Chapter 8, Problem 8.5 from the Course Notes
6. Chapter 8, Problem 8.6 from the Course Notes
7. Chapter 8, Problem 8.7 from the Course Notes
8. Chapter 8, Problem 8.8 from the Course Notes (Matlab Problem)
9. Consider the following simple feedback control block diagram. The plant is $G_p(s) = \frac{4}{s+7}$.



a) What is the bandwidth of the plant alone (assuming there is no feedback)

b) Assuming a proportional controller, $G_c(s) = k_p$, determine the closed loop transfer function, $G_0(s)$

c) Assuming a proportional controller, $G_c(s) = k_p$, determine the value of k_p so the bandwidth of the closed loop system is 27 rad/sec.

d) Assuming the proportional controller from problem c, determine the settling time and the steady state error for a unit step.

Partial Answers: 7, 5, 7/27, 4/27