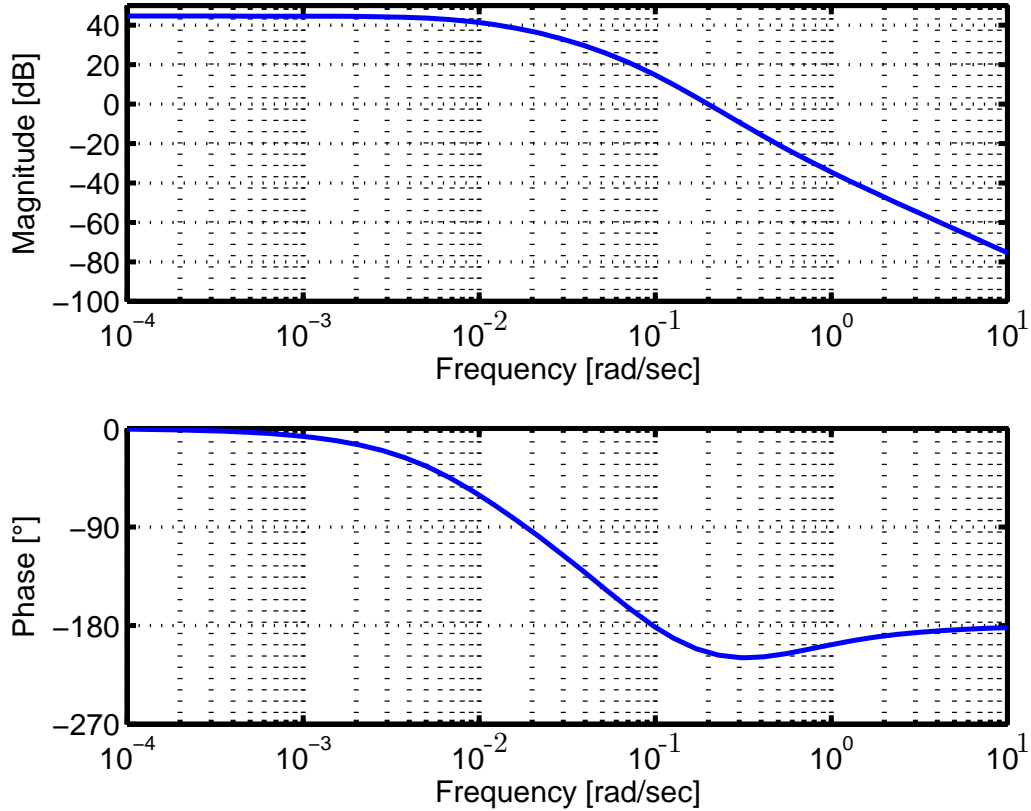


Laboratory 12: Lead Compensator and PID Control

Problem 26:

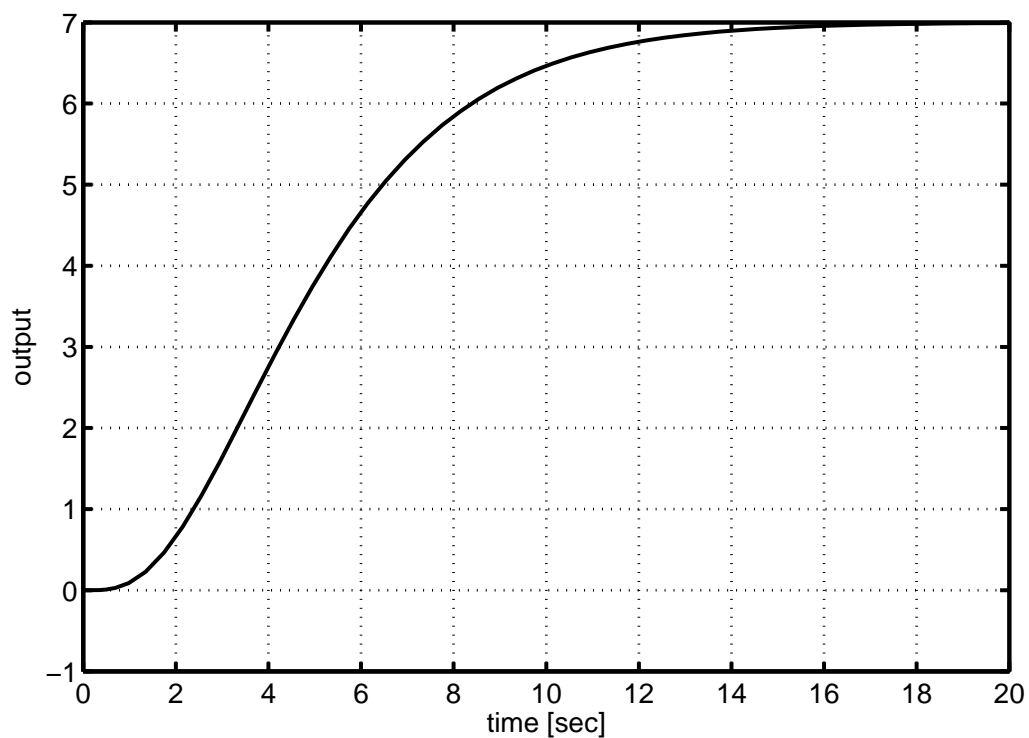
Assume we are given the same plant as in Problem 25 whose bode plot is shown in the following figure.



- a. Design a lead compensator such that the steady-state error for reference steps is approximately 0.0063 and the phase margin is $\Phi_m = 45^\circ$. What is the advantage compared to the proportional controller in Problem 25 c.?
- b. Simulate a reference step response of the feedback loop for the controllers in b.
Hint: Use the plant transfer function on the course webpage.

Problem 27:

Consider the following reaction curve that was measured for a unit step input.



- a. Determine the characteristic plant parameters for a Ziegler-Nichols Reaction Curve design.
- b. Compute the PI controller parameters for a Ziegler-Nichols design.
- c. Compute the PID controller parameters for a Ziegler-Nichols design.
- d. Simulate a reference step response of the feedback loop for the controllers in **b.** and **c.**
Hint: Use the plant transfer function on the course webpage.