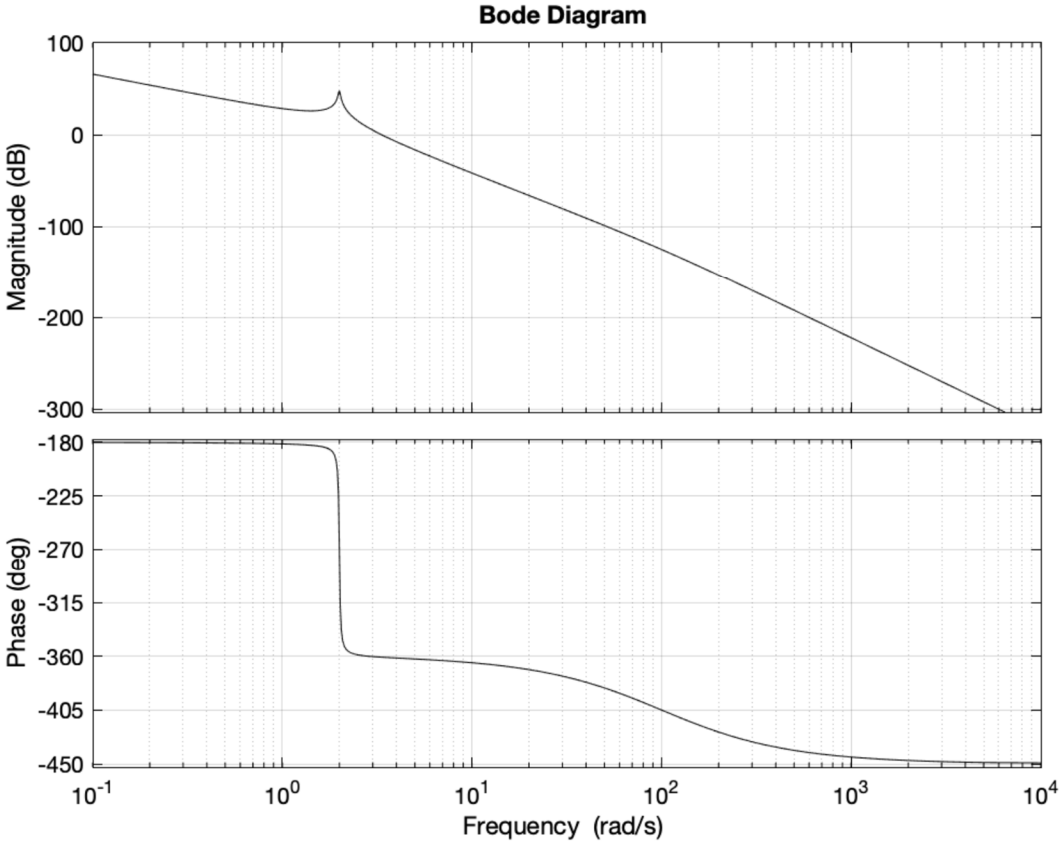
Controls – 2

Consider the Bode plot shown below for the transfer function L(s).



1.1) What is the type number of the system? Why? (**5 pts**)

1.2) What is the relative degree of the system? Why? (**5 pts**)

1.3) What is the position error constant for the system? Why? (**5 pts**)

1.4) Find (a good approximation of) the transfer L(s) function corresponding to this Bode plot. Use the attached sheets to carefully explain how you constructed your approximation. Sketch each contribution to the Bode plot as well as your answer. (**30 pts**)

1.5) What is the gain and phase margin of this system? Is the system stable? Why or why not? (**5 pts**)

1.6) Calculate the impulse response of the system L(s) (for zero initial conditions). (**20 pts**)

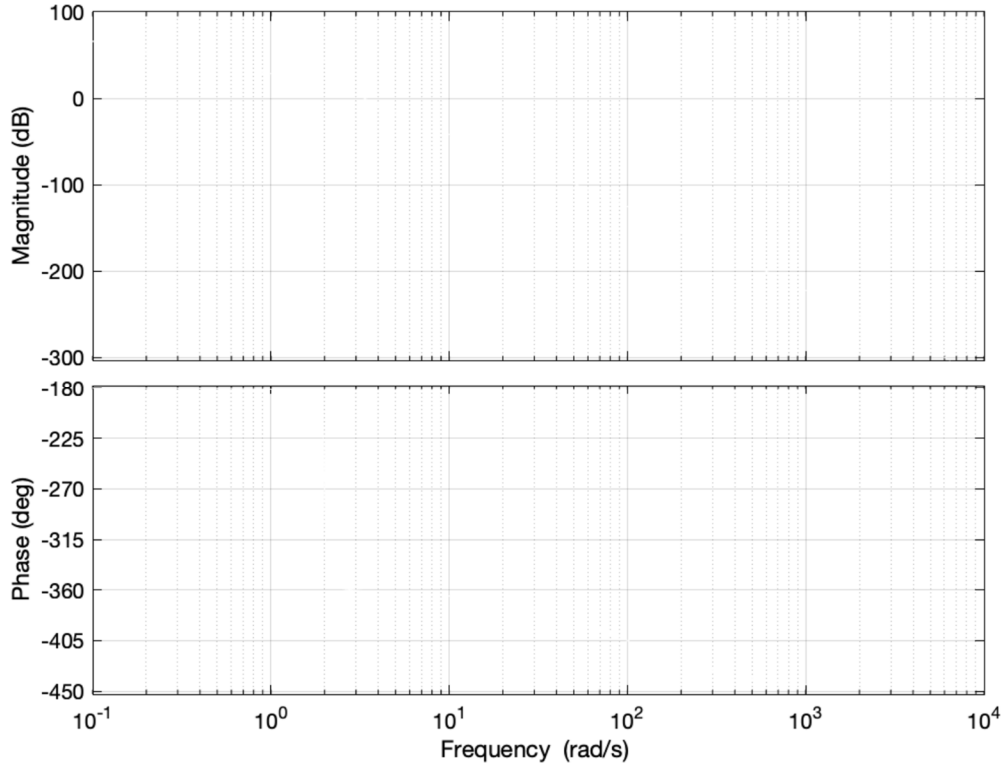
1.7) Sketch the Bode plot of the transfer function

$$L(s) = \frac{s(s-1)}{(s^2-s+100)}$$

Be sure to carefully explain and sketch the contributions of each of the poles and zero to the overall plot. (**30 pts**)

Problems

Graph paper for (1.4)



Graph Paper for (1.7)