EE 327 Signals and Systems 1
Homework

1. Draw the Bode plots of the following systems (asymptotes only).

   a. $H(s) = \dfrac{500}{(s+1)(s+50)}$
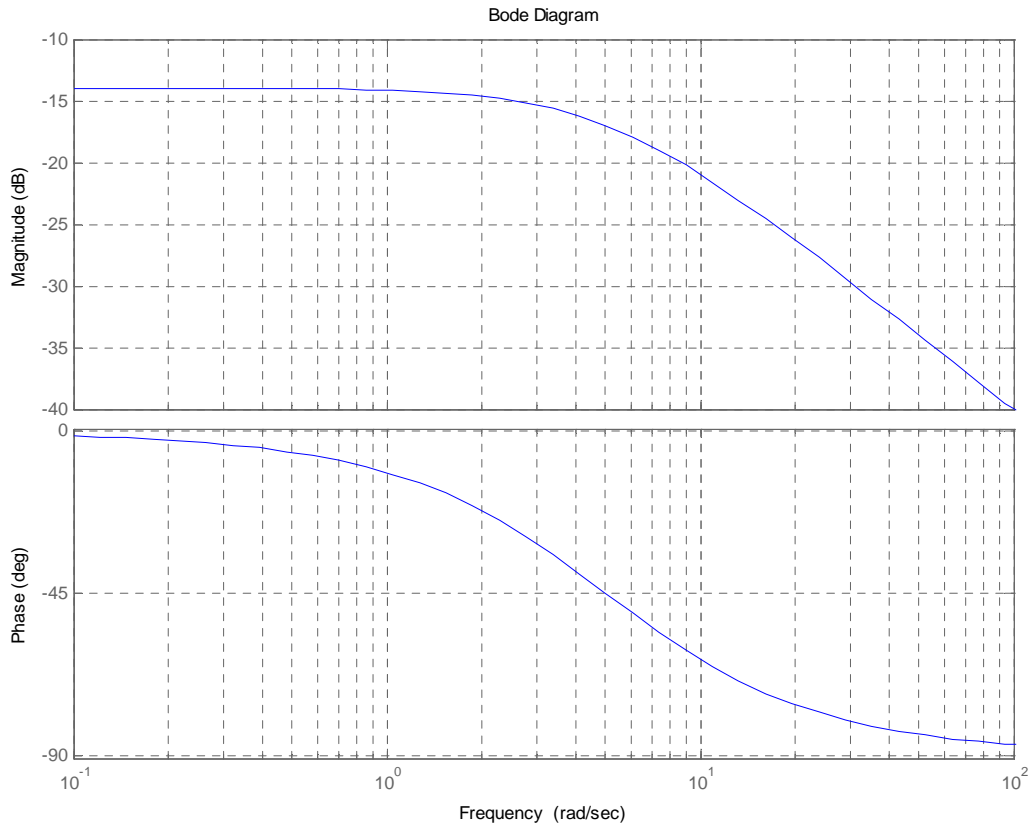
   b. $H(s) = \dfrac{(s+0.1)}{s(s+1)(s+8)}$

   c. $H(s) = \dfrac{1}{s(s^2+8s+64)}$

2. Use MATLAB to generate the Bode plots of the systems defined in Problem 5 parts "b" and "c."

3. Let a system have the following frequency response. Find the output of the system to the following input.

$$x(t) = 10 + 5\cos(t) + 100\cos(10t + 45°)$$

4. Continuous-time filters are given by the following transfer functions. Determine the filter types (what kind of filtering operation), ω_0, Q, and the gain. Also, sketch the Bode plot of each filter (exact response, not just asymptotes).

a. $H(s) = \dfrac{20}{\dfrac{s^2}{100} + \dfrac{s}{10} + 1}$

b. $H(s) = \dfrac{\dfrac{s^2}{10}}{\dfrac{s^2}{100} + \dfrac{s}{20} + 1}$

c. $H(s) = \dfrac{\dfrac{s}{20}}{\dfrac{s^2}{100} + \dfrac{s}{20} + 1}$