Problem 1

Obtain the asymptotes of the Bode plots of the following transfer functions

(a) $\dfrac{100s + 100}{s^2 + 110s + 1000}$

(b) $\dfrac{10s}{s^2 + 3s}$

(c) $\dfrac{-100s}{(s+1)^2 (s+10)}$

(d) $30\left(\dfrac{s+10}{s^2+3s+50}\right)$

(e) $4\left(\dfrac{s^2+s+25}{s^3+100s^2}\right)$

(d) $\dfrac{10}{s^2(1+0.2s)(1+0.5s)}$

Plot using MATLAB the Bode plots of the above transfer functions and compare with asymptotic bode plots.

Problem 2

Obtain the Nyquist Plots of the following transfer functions

(a) $\frac{1}{s+1}$

(b) $\frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$; assume that denominator has complex conjugate stable poles

(c) $\frac{1}{s(s+1)}$

(d) $\frac{1}{s(s-1)}$

(e) $\frac{10}{s^2(1+0.2s)(1+0.5s)}$

Problem 3

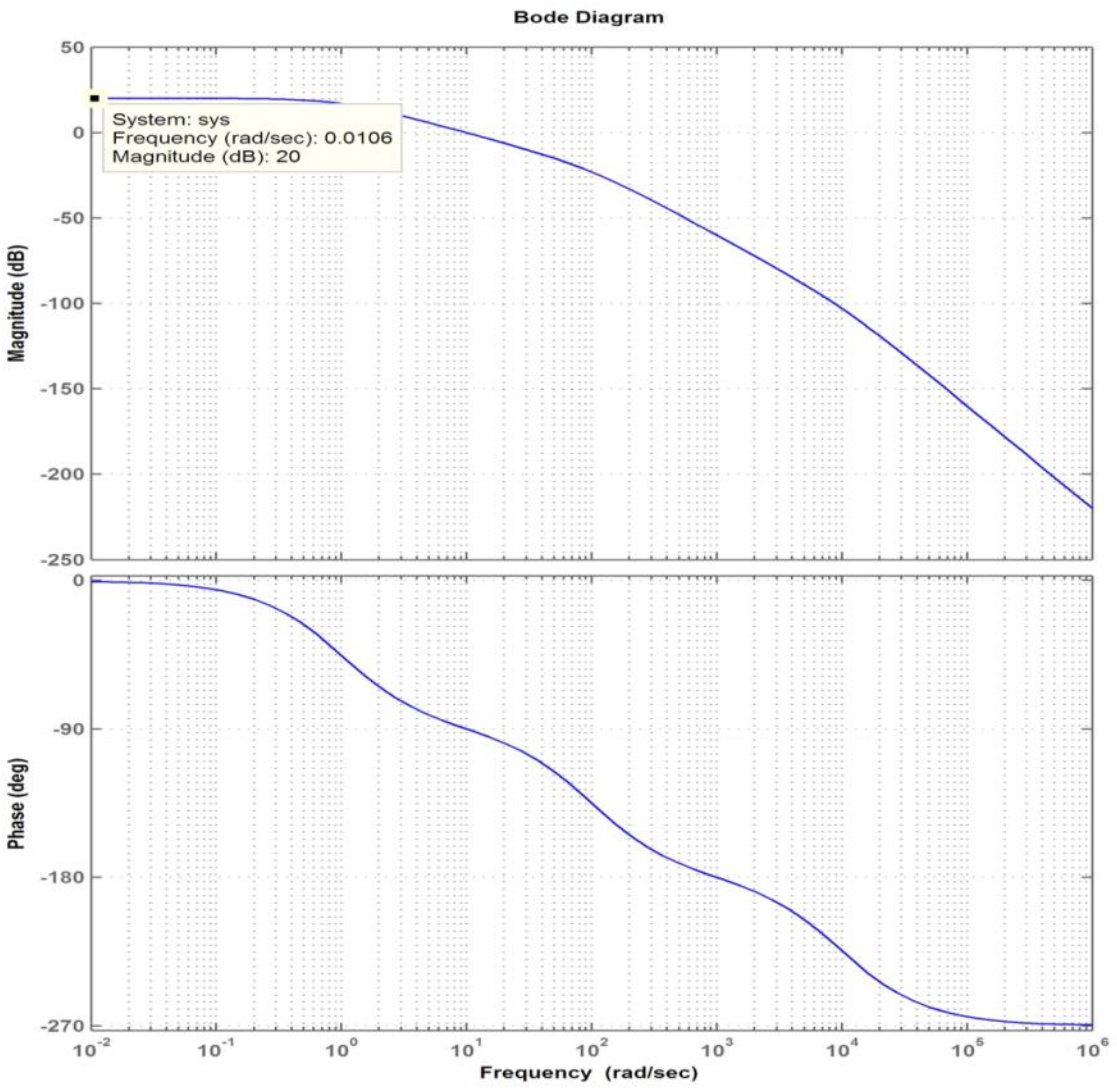
The exercise below provides practice for determining the Nyquist Plot from Bode plots

For the following two Bode plots

(a) Determine the breakpoints from the bode plot and determine the transfer function G

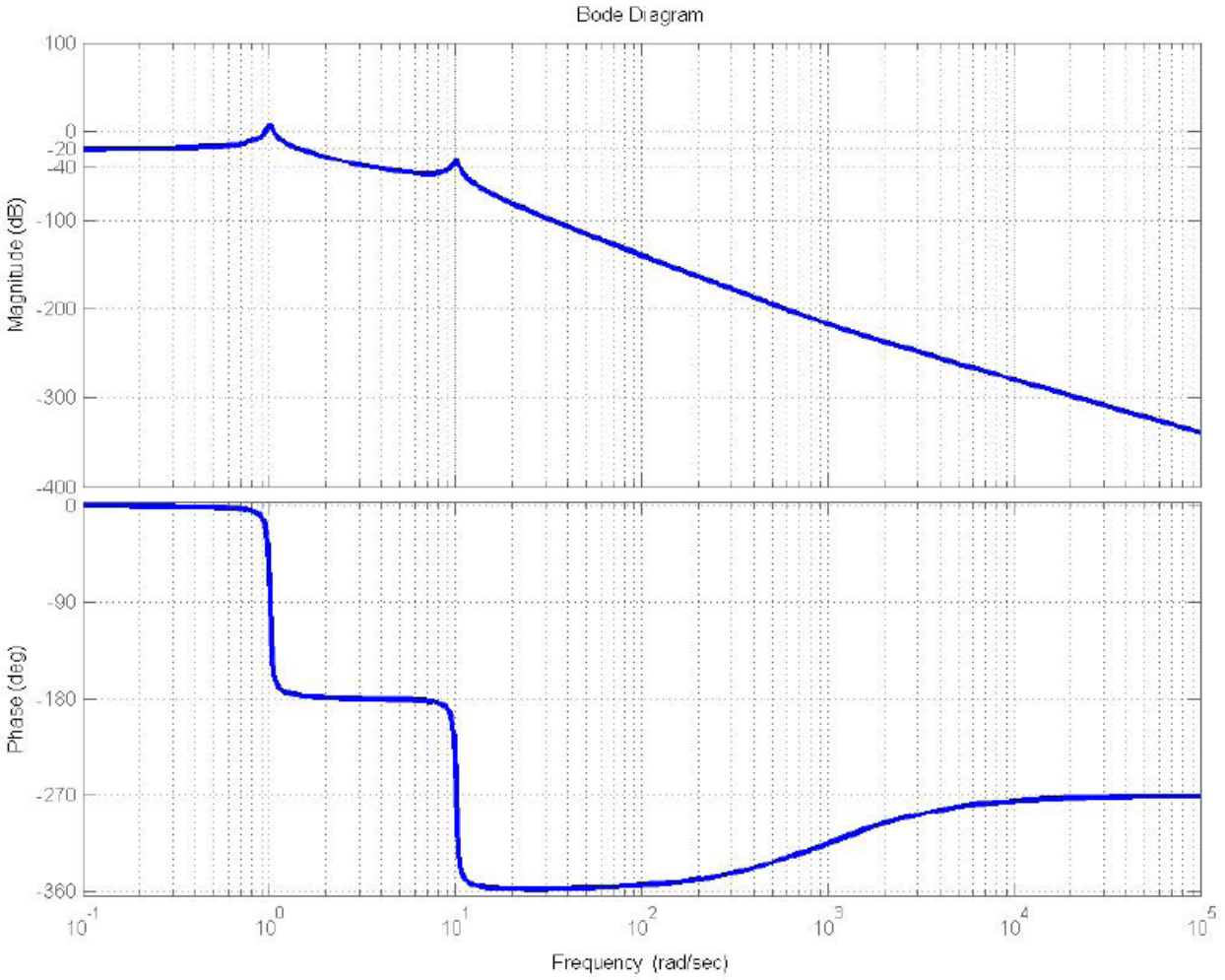
(b) Determine the gain cross-over frequency w_{gc} and the phase cross-over frequency w_{180}.

(c) Plot the Nyquist Plots for the determined transfer functions.



Bode plot 1

Second Bode plot for problem 3.



Bode plot 2.