

ET 438a
Continuous and Digital Control
Bode Plot and Nyquist Plots

- 1.) Find the gain and phase margins for each of the systems described by the following Bode plots. State if the system is stable, marginally stable or unstable by evaluating the gain and phase margins. Give a justification for your choice. Hand in the marked-up plots as part of the assignment
- 2.) For the attached Nyquist diagrams, plot the stability point, the gain margin point and the phase margin point. Determine if the systems represented by the plots are stable, unstable or marginally stable. Give a justification for your choice. Hand in the marked up plot as part of the assignment.

For Bode Plots

A.) Open Loop Transfer Function

$$\frac{2500}{s(s+5)(s+50)}$$

B.) Open Loop Transfer Function

$$\frac{250}{s^3 + 6.5s^2 + 8s + 2.5}$$

C.) Open Loop Transfer Function

$$\frac{80}{s(s+5)(s+15)}$$

For Nyquist Plots

A.) Open Loop Transfer Function

$$\frac{17.5}{0.7s+1}e^{-0.08s}$$

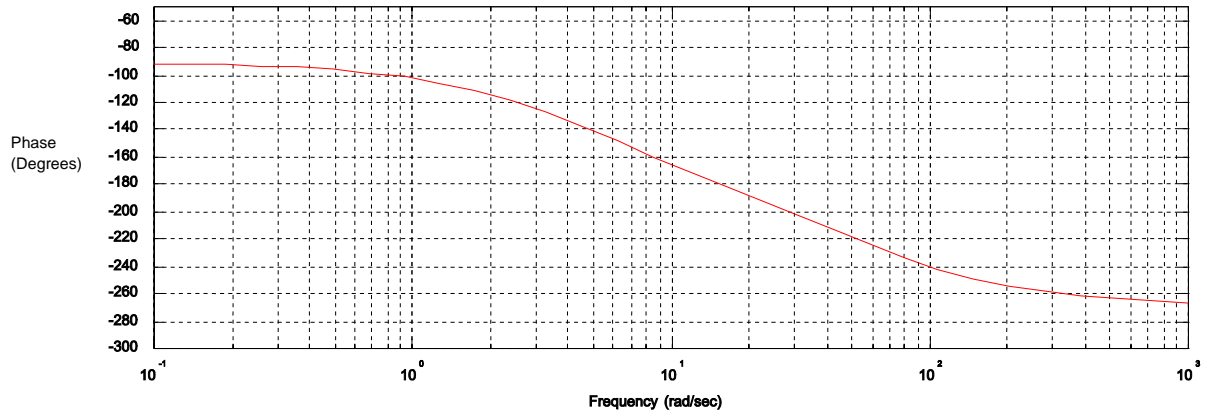
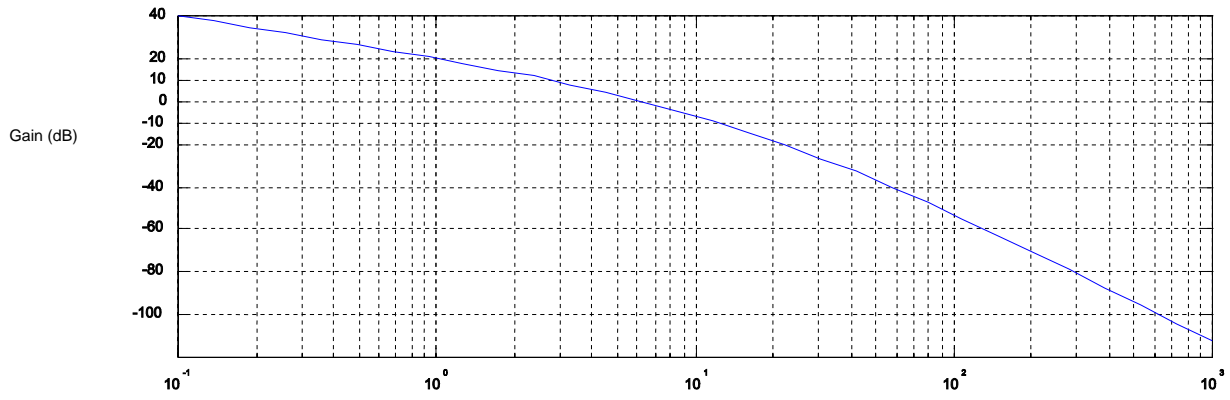
B.) Open Loop Transfer Function

$$\frac{17.5}{0.7s+1}e^{-0.01s}$$

C.) Open Loop Transfer Function

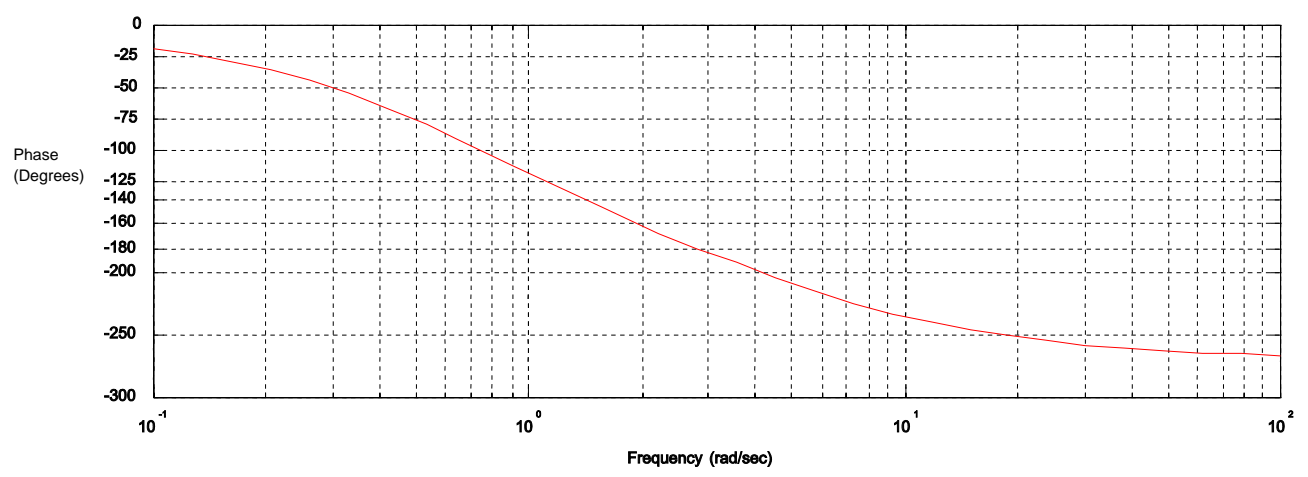
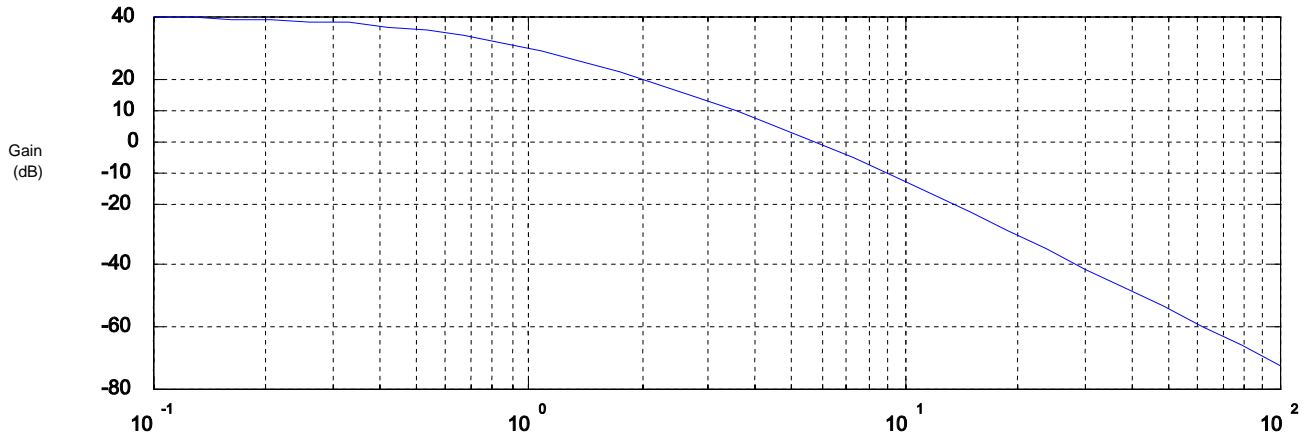
$$\frac{80.5}{0.7s+1}e^{-0.01s}$$

Problem Bode Plots



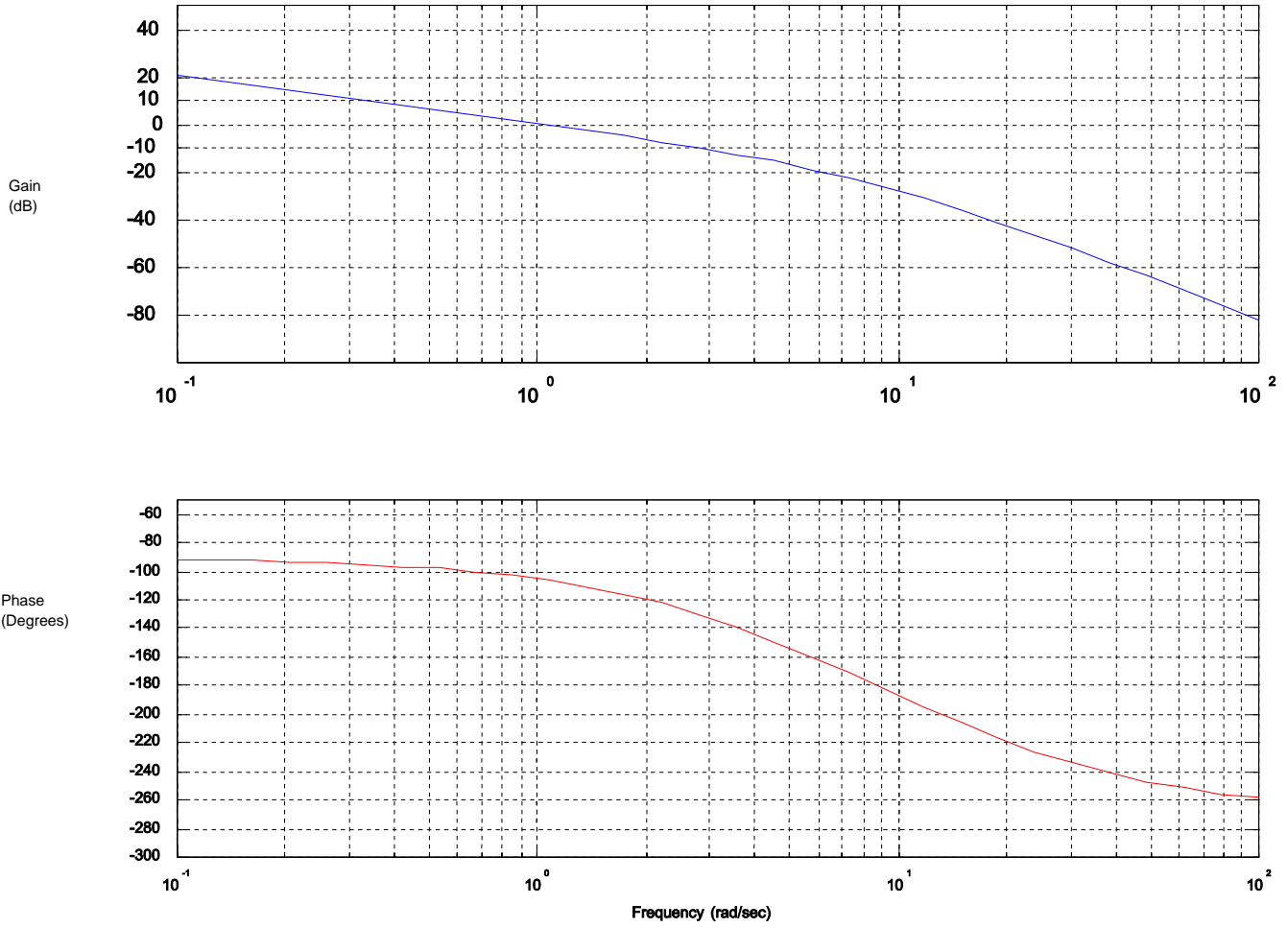
Control System A

Problem Bode Plots

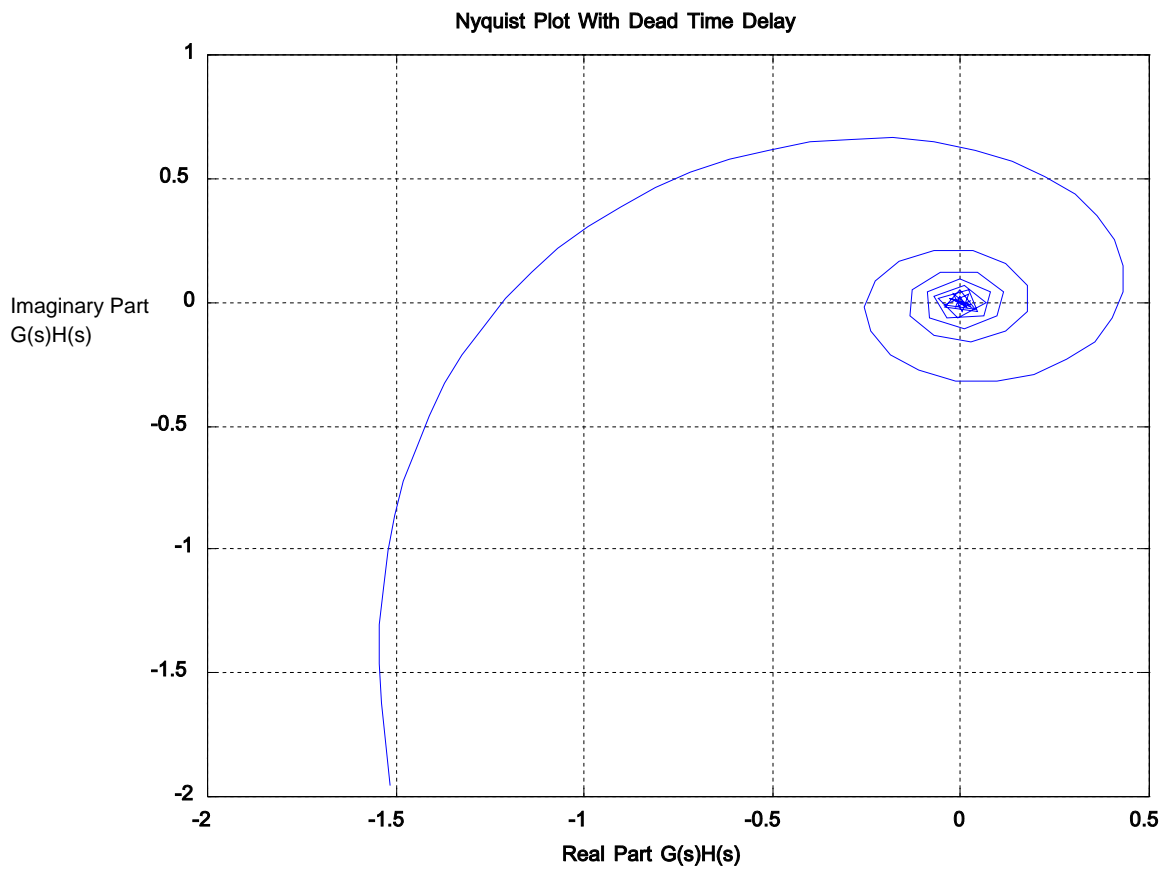


Control System B

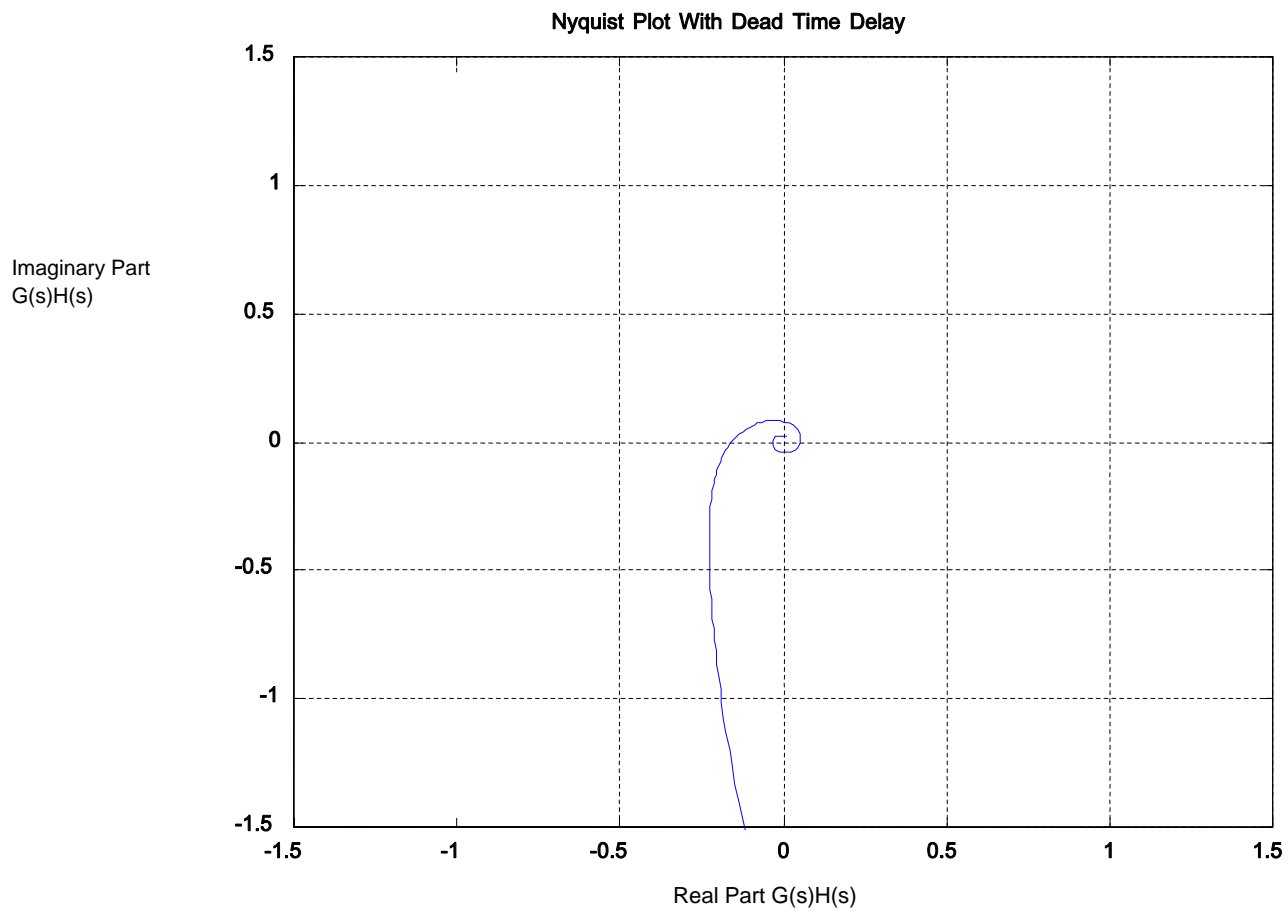
Problem Bode Plots



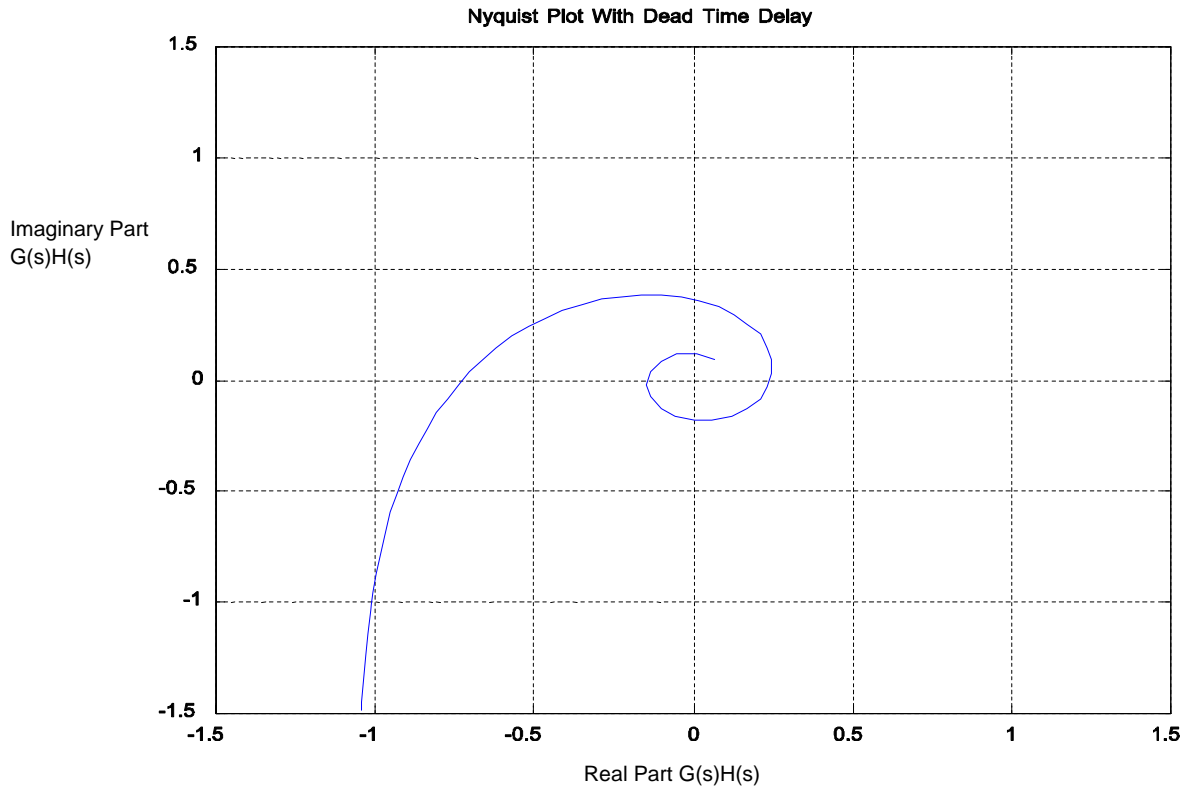
Control System C



Nyquist Plot A



Nyquist Plot B



Nyquist Plot C