Laboratory 10: Nyquist Plot

Problem 21:

a. Sketch (by hand) the Nyquist plot of the following transfer functions

$$G_1(s) = \frac{1}{s+4} \qquad\qquad G_2(s) = \frac{1}{s(s+10)(s+20)}$$

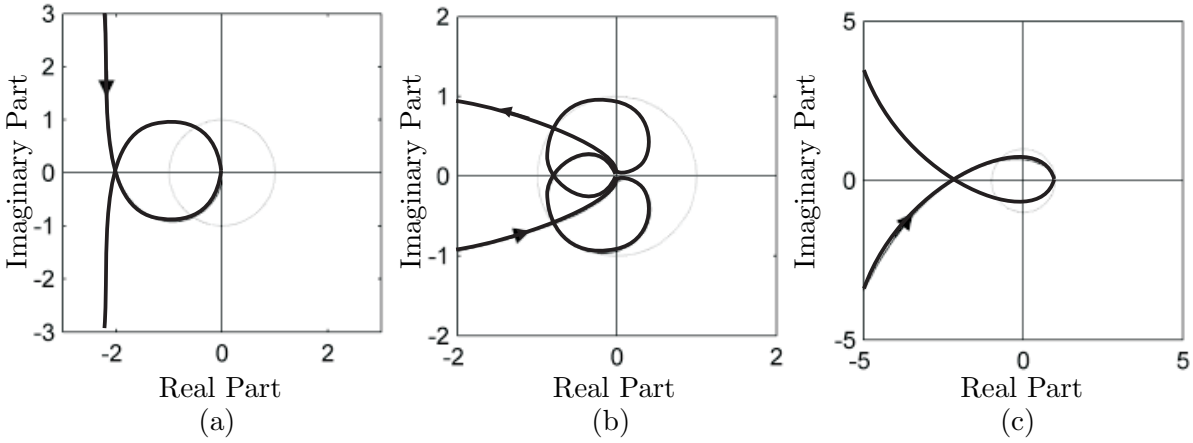
b. Compare your result in **a.** to the Nyquist plot obtained in Matlab (command `nyquist`).

Problem 22:

The following three open-loop transfer functions are given

$$G_{o1}(s) = \frac{85(s+1)(s^2+2s+43.25)}{s^2(s^2+2s+82)(s^2+2s+101)}$$
$$G_{o2}(s) = \frac{s^4+2s^3+1.5s^2+3.5s+4}{s(s+1)^3}$$
$$G_{o3}(s) = \frac{20(s+1)}{s(s-10)}$$

a. Match the above transfer functions to the Nyquist plots in the following figure.



b. Verify your result using Matlab.

Problem 23:

We determined the Bode plot for the transfer function $G(s) = \dfrac{10\,s+5}{2\,s^2+4\,s+2}$ in Problem 19. We want to compare the Bode plot and the Nyquist plot of $G(s)$:

a. Use Matlab to find the Bode plot and the Nyquist plot of $G(s)$

b. Choose three frequencies ω. Find $|G(j\omega)|$ and $\angle(G(j\omega))$ for these frequencies in the Bode plot and in the Nyquist plot.