

Homework 5 Problems
Due: Tuesday, May 18th at 4:00 PM

Problems: 5.5c, 5.5e, 5.7c, 5.7e, 5.8e

- 5.5** *Complex poles and zeros.* Sketch the root locus with respect to K for the equation $1 + KL(s) = 0$ and the listed choices for $L(s)$. Be sure to give the asymptotes and the arrival and departure angles at any complex zero or pole. After completing each hand sketch, verify your results using Matlab. Turn in your hand sketches and the Matlab results on the same scales.

(c) $L(s) = \frac{(s^2+2s+8)}{s(s^2+2s+10)}$

(e) $L(s) = \frac{s^2+1}{s(s^2+4)}$

- 5.7** *Mixed real and complex poles.* Sketch the root locus with respect to K for the equation $1 + KL(s) = 0$ and the listed choices for $L(s)$. Be sure to give the asymptotes and the arrival and departure angles at any complex zero or pole. After completing each hand sketch, verify your results using Matlab. Turn in your hand sketches and the Matlab results on the same scales.

(c) $L(s) = \frac{(s+3)^2}{s^2(s+10)(s^2+6s+25)}$

(e) $L(s) = \frac{[(s+1)^2+1]}{s^2(s+2)(s+3)}$

- 5.8** *RHP and zeros.* Sketch the root locus with respect to K for the equation $1 + KL(s) = 0$ and the listed choices for $L(s)$. Be sure to give the asymptotes and the arrival and departure angles at any complex zero or pole. After completing each hand sketch, verify your results using Matlab. Turn in your hand sketches and the Matlab results on the same scales.

(e) $L(s) = \frac{(s+2)}{s(s-1)(s+6)^2}$