

1. The transfer functions of $C(s)$ and $P(s)$ are given below. In each case determine if the steady-state error will go to zero and whether disturbances will be completely rejected.

a) $C(s) = \frac{s+4}{s^2+3s+2}$

$P(s) = \frac{s+1}{s^2+3s}$

b) $C(s) = \frac{s+1}{s^2+3s}$

$P(s) = \frac{s+4}{s^2+3s+2}$

c) $C(s) = \frac{s \cdot (s+6)}{s^2+3s+2}$

$P(s) = \frac{s+8}{s^2+12s}$

d) $C(s) = \frac{s+9}{s^2+3s+2}$

$P(s) = \frac{s}{s+16}$

e) $C(s) = \frac{s+1}{s^2+5s+6}$

$P(s) = \frac{s+1}{s^2+8s+15}$

f) $C(s) = \frac{s+1}{s^3+7s^2+12s}$

$P(s) = \frac{s+1}{s+3}$

2. Problem 4.2 (p.96) in the text.

3. Sketch the root-locus plots for the following open-loop transfer functions:

a) $\frac{s+2}{s \cdot (s+4)}$

b) $\frac{1}{s \cdot (s+2)}$

c) $\frac{1}{s \cdot (s+2) \cdot (s+4)}$

d) $\frac{s+7}{s \cdot (s+2) \cdot (s+4)}$

e) $\frac{s+3}{s \cdot (s+2) \cdot (s+4)}$

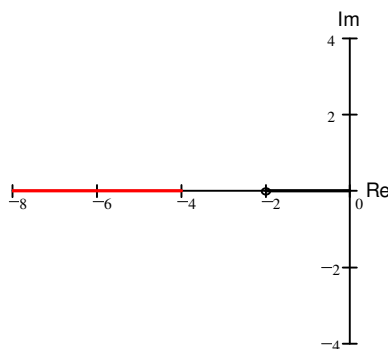
f) $\frac{8}{(s+2)^3}$

Answers

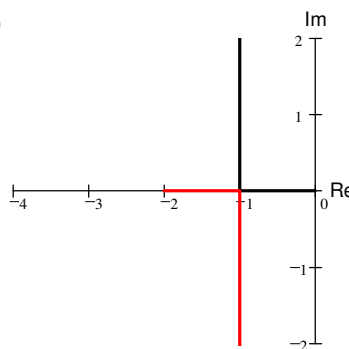
1. a) Yes No b) Yes Yes c) No No d) No Yes e) No No f) Yes Yes

2. a) Yes b) No c) No

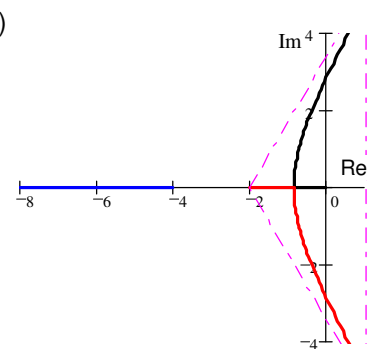
3. a)



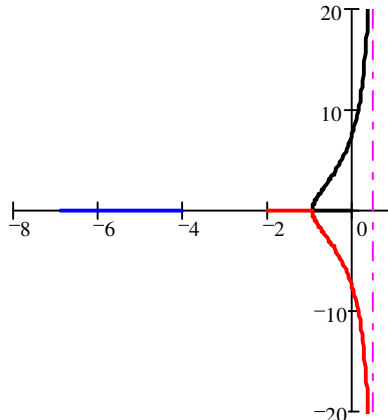
b)



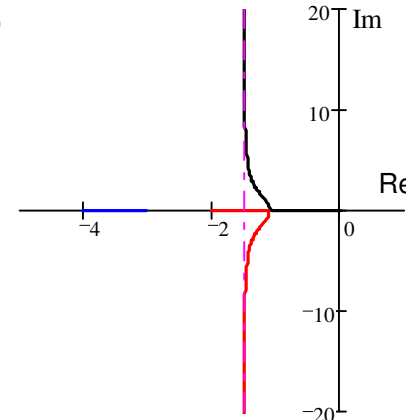
c)



d)



e)



f)

