You may sketch these using a computer program.

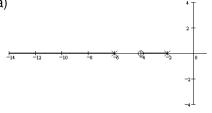
 $C(s) = \frac{s + 2 \cdot a}{s + a}$ and a plant: $P(s) = \frac{k_p}{s + 6}$ are combined to form an open-loop 1. A compensator:

transfer function: $G(s) = \frac{k_p}{(s+6)} \cdot \frac{(s+2\cdot a)}{(s+a)}$

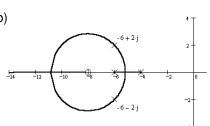
- a) Sketch a conventional root-locus plot taking $k_{\rm p}$ as the gain and a=2.
- b) Sketch a conventional root-locus plot taking k_p as the gain and a=4.
- c) Sketch a nonconventional root-locus plot taking a as the "gain". k_p is not specified.
- d) Sketch a nonconventional root-locus plot taking a as the "gain" and $k_{p} = 2. \label{eq:kp}$
- e) What are the closed-loop poles if a=4 and $k_p=2$? Show that these poles fit on the root locus drawn in part b) as well as the root locus drawn in part d.
- $C(s) = \frac{a}{s+a}$ and a plant: $P(s) = \frac{k_p \cdot s}{(s+4)^2}$ are combined to form an open-loop 2. A compensator: transfer function.
 - a) Sketch a conventional root-locus plot taking \boldsymbol{k}_{p} as the gain and some a < 4.
 - b) Sketch a conventional root-locus plot taking $k_{\rm p}$ as the gain and some a>4.
 - c) Sketch a nonconventional root-locus plot taking a as the "gain" and $k_{\rm p}$ = 2.

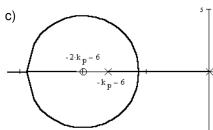
Answers

1. a)

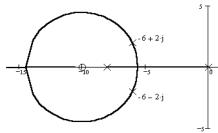


b)





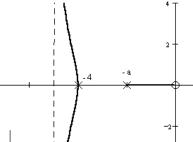
d)



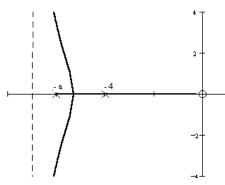
$$-6-2\cdot j$$

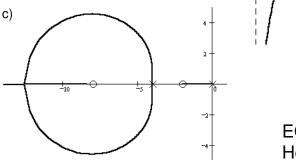
see b, above and d, at left





b)





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