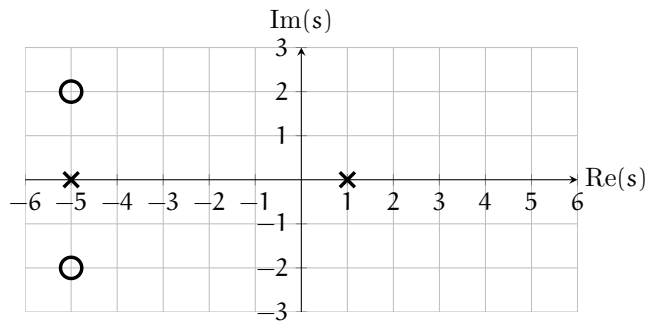


# rlocus.exe Exercises for Chapter rlocus

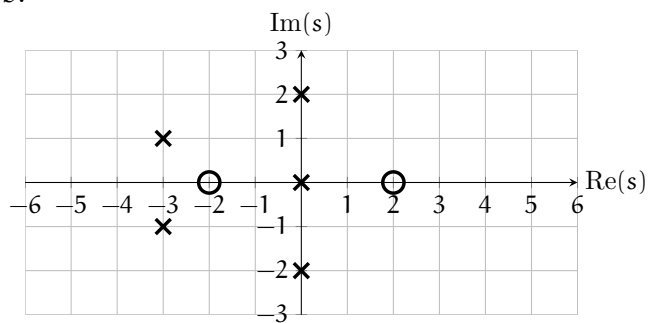
## Exercise rlocus.burritosteve

Given the open-loop pole-zero plots below, sketch the root locus plots (use this sheet) for positive controller gain  $K$ .

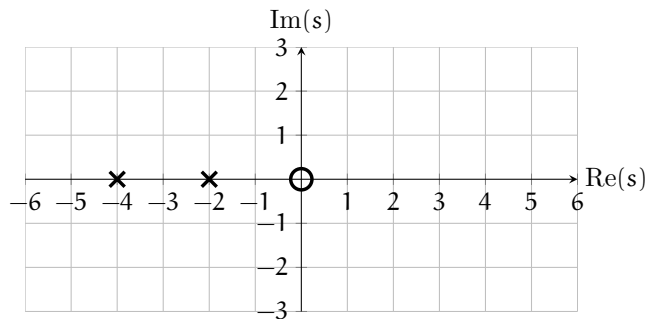
a.



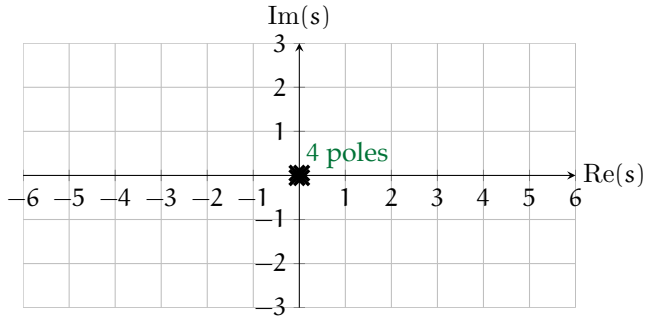
b.



c.



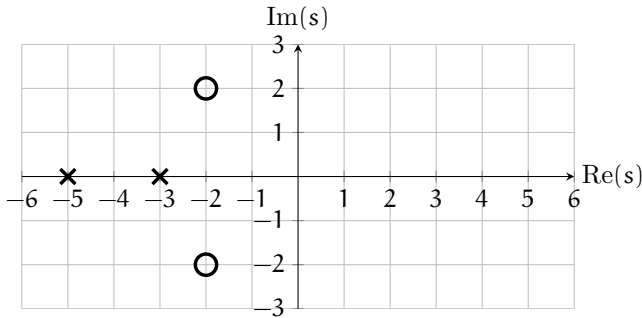
d.



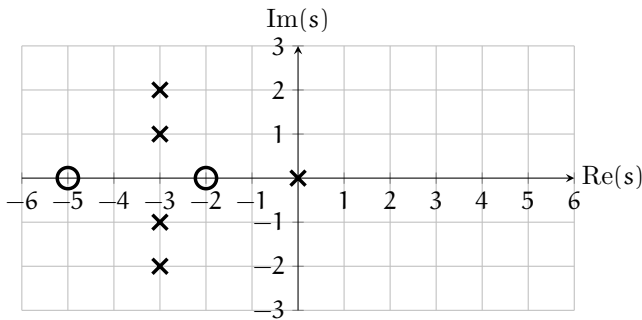
### Exercise rlocus.dunnage

Given the open-loop pole-zero plots below, sketch the root locus plots (use this sheet) for positive controller gain  $K$ .

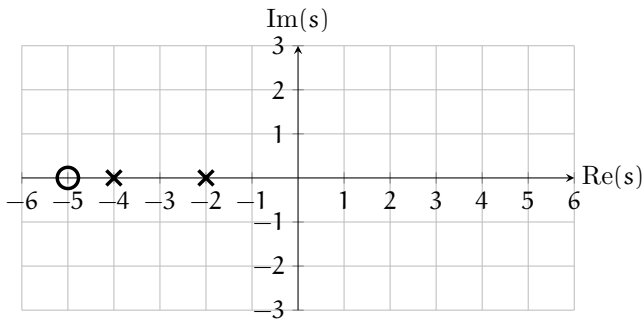
1.



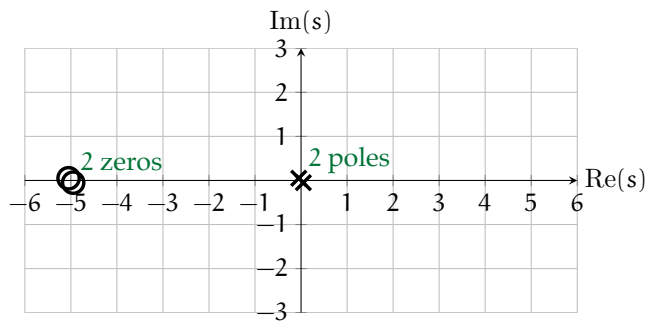
2.



3.



4.



## Root-locus design

In root locus design, our task is to place the dominant closed-loop poles such that the closed-loop system

1. is stable ([Chapter stab](#)),
2. has desirable transient response performance characteristics ([Chapter trans](#)), and
3. has desirable steady-state response characteristics ([Chapter steady](#)).

Several types of controllers can be designed using these techniques. The most basic is gain control ([Lec. rldesign.P](#)), which gives us a single parameter—the loop gain—for controller design. The others we consider here are of two main types: proportional-integral-derivative (PID) and proportional-lead-lag. The two are quite similar, but the latter can be implemented with passive circuits, whereas the former require active circuits.