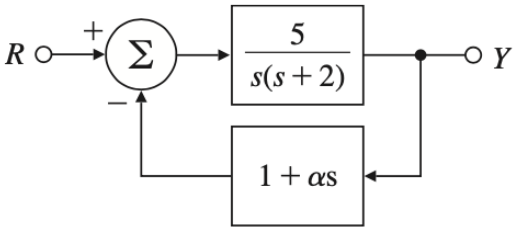
HOMEWORK 6

5.9 Put the characteristic equation of the system shown in Fig. 5.45 in root-locus form with respect to the parameter α, and identify the corresponding $L(s)$, $a(s)$, and $b(s)$. Sketch the root locus with respect to the parameter α, estimate the closed-loop pole locations, and sketch the corresponding step responses when $\alpha = 0, 0.5$, and 2. Use Matlab to check the accuracy of your approximate step responses.



5.13 For the system in Fig. 5.47,

(a) Find the locus of closed-loop roots with respect to K.

(b) Is there a value of K that will cause all roots to have a damping ratio greater than 0.5?

(c) Find the values of K that yield closed-loop poles with the damping ratio $\zeta = 0.707$.

(d) Use Matlab to plot the response of the resulting design to a reference step.