MAE 444/544 Digital Control Systems

Homework 5

The closed loop transfer function of a digital control system is

$$\frac{C(z)}{R(z)} = \frac{D(z)G(z)}{1 + D(z)G(z)}$$

where

$$G(z) = \frac{Kz}{(z-1)^2}$$

and

$$D(z) = \frac{z+a}{z+b}$$

Sketch the root loci of the characteristic equation for $0 < K < \infty$ for the following values of a and b.

1. a = -0.5, and b = -0.1
2. a = -0.7, and b = -0.1
3. a = -0.9, and b = -0.1

Comment on the effects of the various values of a and b on the root loci and system stability.