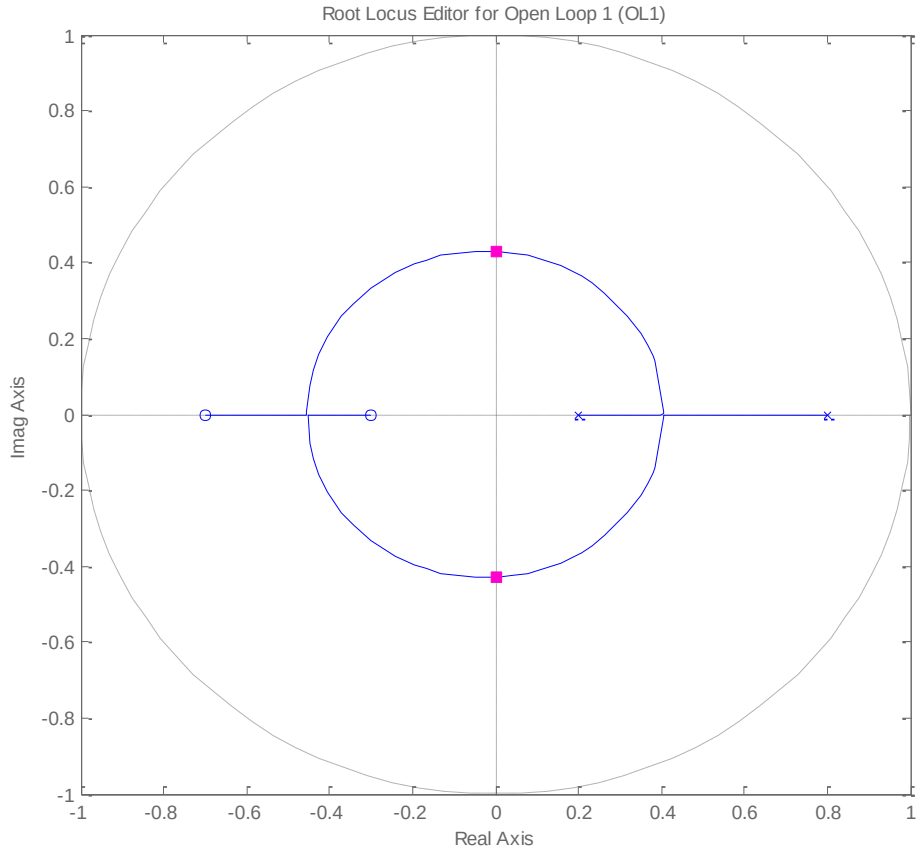
ECE-320,
Practice Quiz #4

Problems 1 and 2 refer to the following root locus plot for a discrete-time system



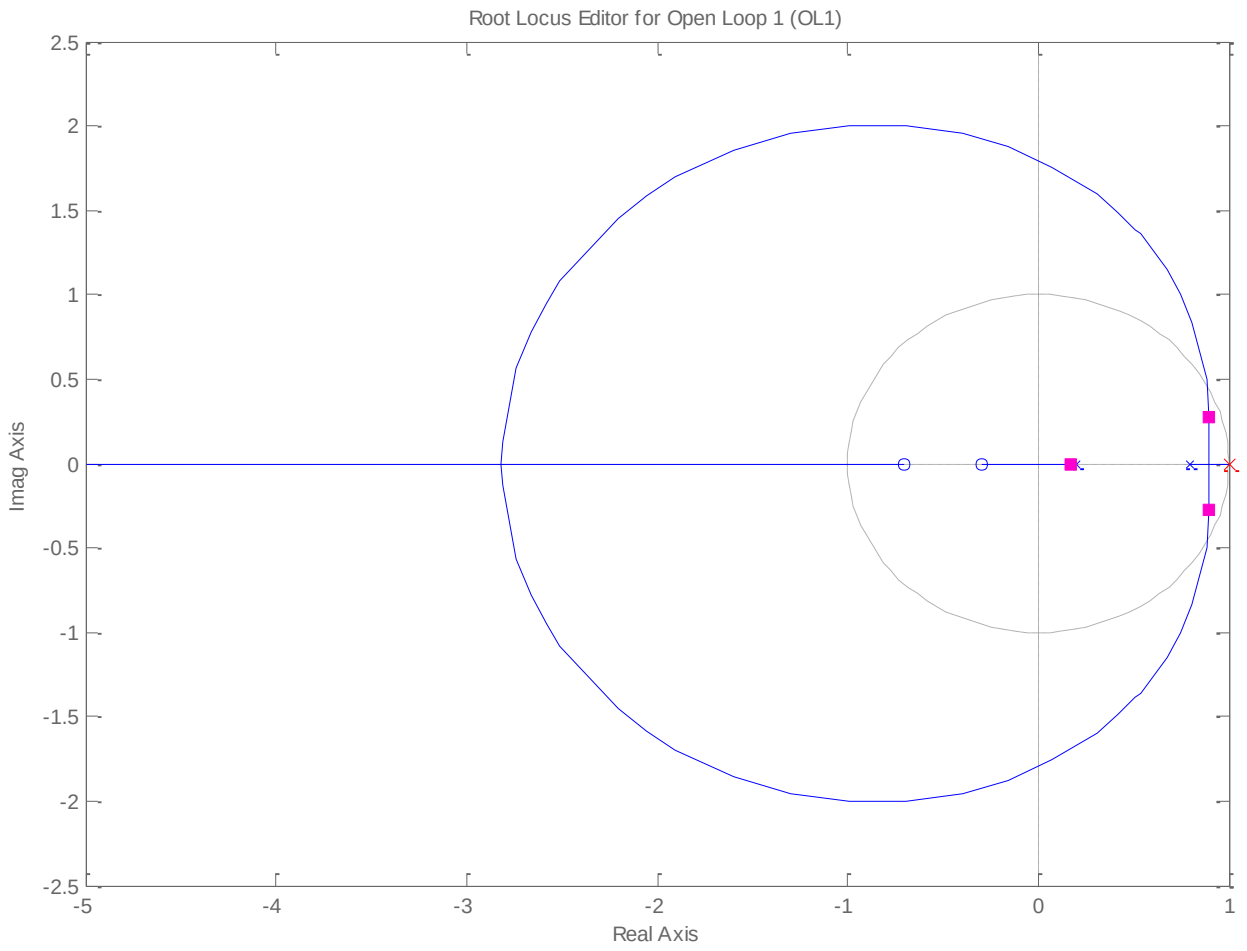
1) Are there any values of *k* (the variable parameter) for which the system is stable?

a) yes b) no c) there is not enough information to answer

2) As *k* increases, the close loop poles of the system

a) move to the left b) move to the right c) do not move at all

Problems 3-5 refer to the following root locus plot for a discrete-time system



3) With the closed loop pole locations shown in the figure, is the closed loop system stable?

a) yes b) no c) not enough information

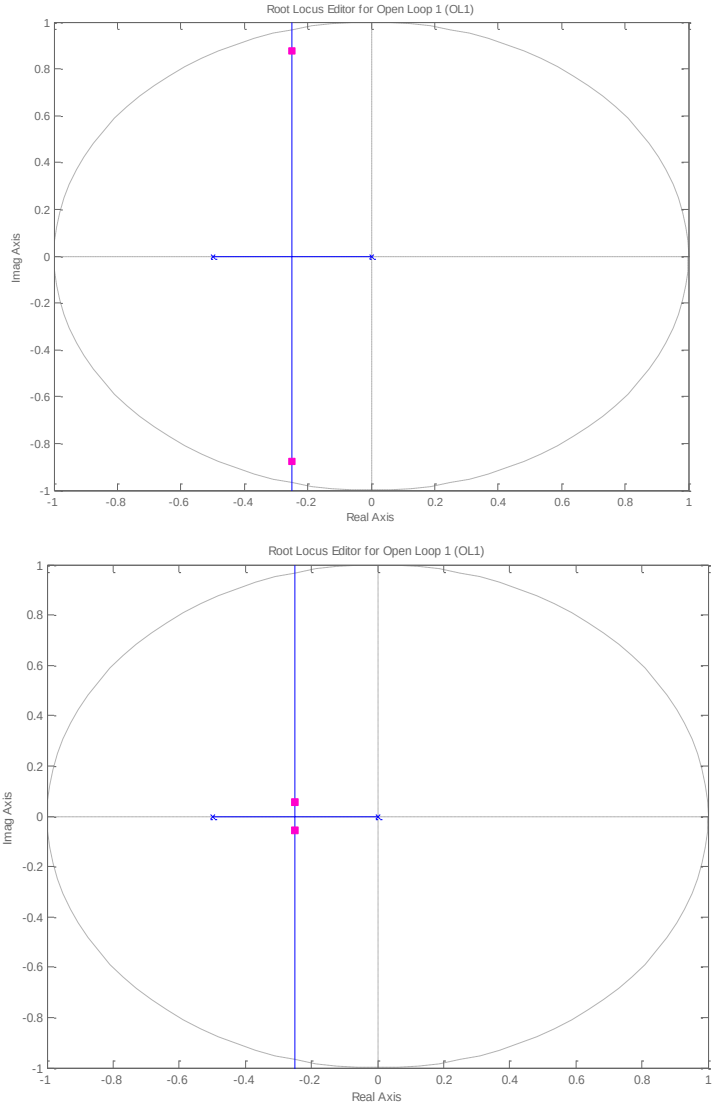
4) Is there any value of k for which the closed loop system is stable?

a) yes b) no c) not enough information

5) Is this a type one system?

a) yes b) no c) not enough information

Problems 6 and 7 refer to the following two root locus plot for a discrete-time system



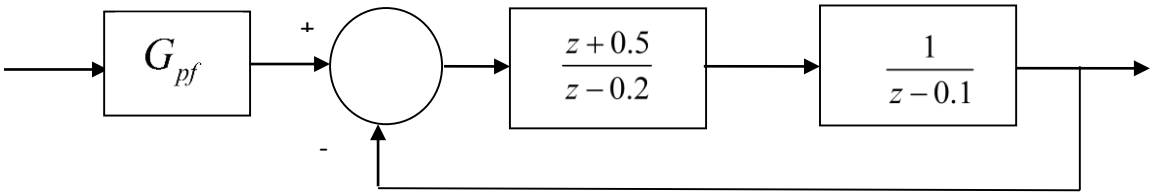
6) For which system is the settling time likely to be smallest?

a) The system on the top b) the system on the bottom c) the settling time will be the same

7) Is this a type 1 system?

a) yes b) no c) not enough information

Problems 8- 10 refer to the following system:

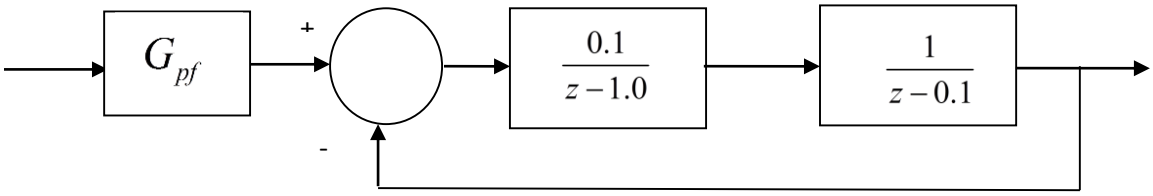


8) Assuming the prefilter G_{pf} is 1, estimate the **position error constant** K_p

9) Assuming the prefilter G_{pf} is 1, estimate the **steady state error** for a unit step as

10) Estimate the value of the prefilter G_{pf} that produces **a steady state error** of zero for a step input

Problems 11- 13 refer to the following system with a sampling interval $T = 0.1$ seconds :



11) Assuming the prefilter G_{pf} is 1, estimate the **velocity error constant** K_v

12) Assuming the prefilter G_{pf} is 1, estimate the **steady state error** for a unit ramp

13) Estimate the value of the prefilter G_{pf} that produces **a steady state error** of zero for a step input

Answers: 1-a, 2-a, 3-a, 4-a, 5-a, 6-b, 7-b, 8-2.083, 9-0.324, 10-1.480 , 11-1.111, 12-0.900, 13 – 1.000;