ECE 486 (Control Systems) – Homework 4

Due: Feb. 25

Problem 1. Without a computer, determine whether or not the following polynomials have any RHP roots:

i) $s^4 + 10s^3 + 15s^2 + 20s + 1$

ii) $s^6 + 2s^5 - 3s^4 + s^3 + s^2 + 3s + 5$

iii) $s^4 + 10s^3 + 12s^2 + 20s + 1$

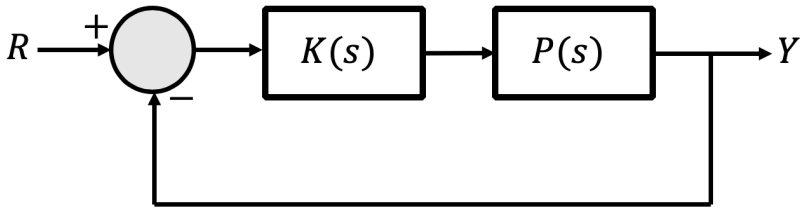

Figure 1: A diagram of a unity feedback system.

Problem 2. Consider the unity feedback system in Figure 1. Let the plant's transfer function be given by:

$$P(s) = \frac{1}{s^3 + 2s^2 + 2s + 1}$$

Suppose our controller is just constant, i.e. $K(s) = K$.

Use the Routh-Hurwitz criterion to determine which values of K stabilize the closed-loop system.