

Due Tuesday, October 27

1. Use a Routh-Hurwitz array to determine if the following polynomials are stable (have all roots in left half-plane) or not.

(a) $s^3 + 2s^2 + 3s + 1$

(b) $s^4 + s^3 + 5s^2 + 2s + 4$

2. Problem 6.5 from the book.
3. Problem 6.7 (a), (b) from the book.
4. Consider the following unstable system:

$$G(s) = \frac{(s+1)(s+6)}{s(s+2)(s-1)}.$$

This system can be stabilized by a negative unity feedback control system using only a proportional gain in the forward path. The closed-loop transfer function is

$$\frac{KG(s)}{1 + KG(s)}.$$

Use a Routh-Hurwitz array to find the range of K over which the closed-loop system is stable.