

AAE 364 Control Systems Analysis

Problem Set 5

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Reading Assignment:

Section 1 - 8 in Chapter 5. (Do not need to read the parts on the State Space method.)

Problem 1

Solve B-5-5, B-5-8, B-5-10, B-5-21, B-5-22 and B-5-23.

Problem 2

1. Figure 2 is a block diagram of a spacecraft attitude control system. Assuming the time constant T of the controller to be 3 sec and the ratio K/J to be $\frac{2}{9} \text{ rad}^2/\text{sec}^2$, find the damping ratio of the closed-loop system.

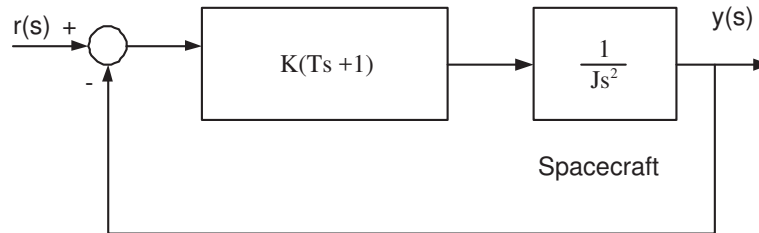


Figure 1: Spacecraft attitude control system

Problem 3

Consider the unity-feedback control system in Figure 2 with the following open-loop transfer function:

$$G(s) = \frac{5}{s(s+1)(s+3)}$$

Compute the steady state error of the closed-loop system with respect to the input $r(t) = 2t$

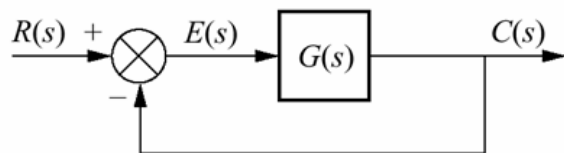


Figure 2: Unity-feedback system