National Taiwan University

Department of Engineering Science and Ocean Engineering
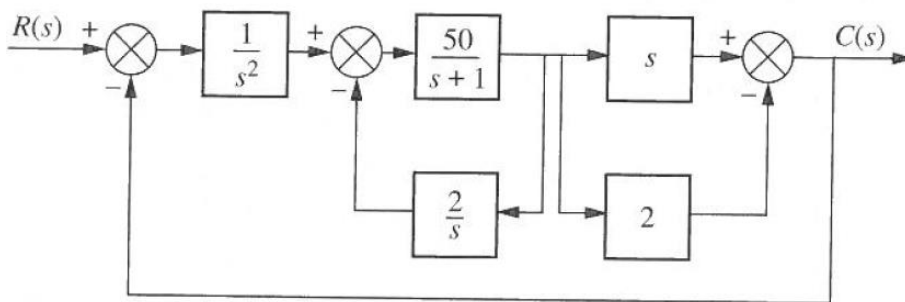
2019 Winter Semester

Homework 3

Chap 5 Equivalent Systems

1. Chap 5 Prob. 1

1. Reduce the block diagram shown in Figure P5.1 to a single transfer function, $T(s) = C(s)/R(s)$. Use the following methods:

a. Block diagram reduction [Section: 5.2]

2. Chap 5 Prob. 10

10. In Figure P5.10, find the values of K and α that will result in a percent overshoot of 10 and a settling time of 0.17 sec.
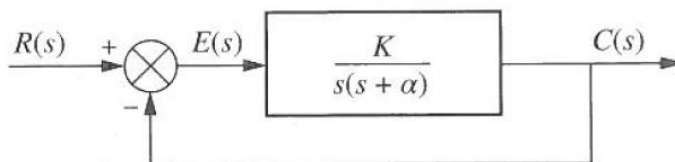

FIGURE P5.10

3. Chap 5 Prob. 11

11. Refer to Figure P5.11. Find the value of K_1 and K_2 that will result in a step response with a peak value of 1.5 sec. and a settling time of 3 sec.
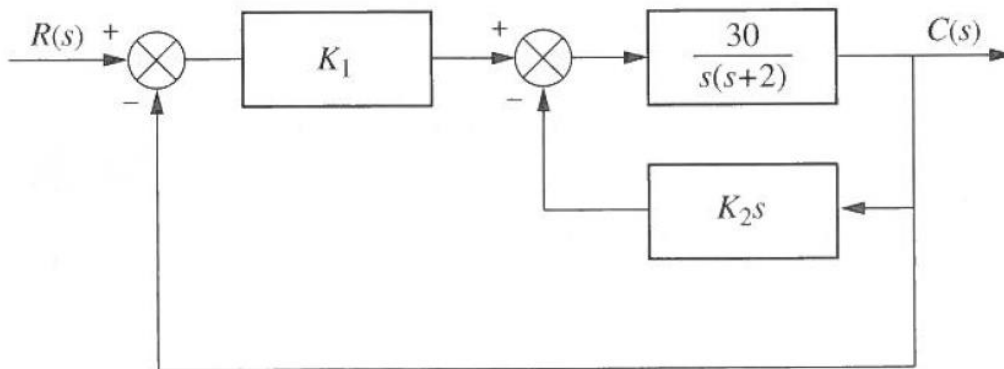

R(s), K₁, 30/s(s+2), C(s), K₂s block diagram

FIGURE P5.11

4. Chap 5 Prob. 25

25. Develop a state space representation for the system of Figure P5.18

    Sta

a. In phase-variable form

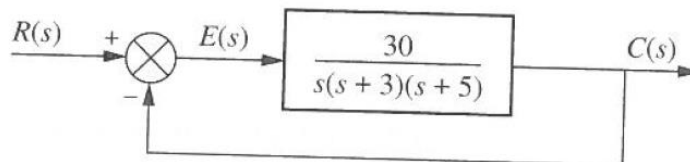b. In any form other than phase-variable

R(s), E(s), 30/s(s+3)(s+5), C(s) block diagram

FIGURE P5.18