ELEC 312 - Systems I
Homework Assignment 4

Due Wednesday, March 11, 2015 for Section 01
Due Wednesday, March 11, 2015 for Section 81

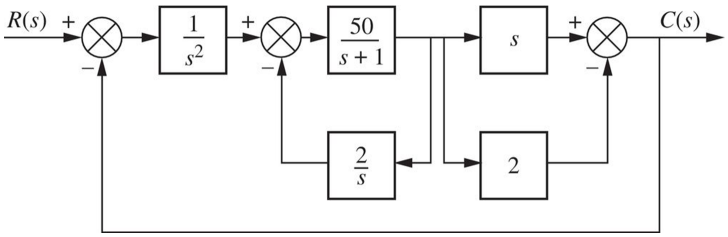

Figure P5.1

1. Chapter 5, Problem 1, *Control Systems Engineering*:
   Reduce the block diagram shown in Figure P5.1 (above) to a single transfer function, $T(s) = C(s)/R(s)$. Use block diagram reduction.

2. Chapter 5, Problem 1 (modified), *Control Systems Engineering*:
   Convert the block diagram shown in Figure P5.1 (above) to a signal-flow graph. Use Mason's gain formula to determine the closed-loop transfer function, $T(s) = C(s)/R(s)$.

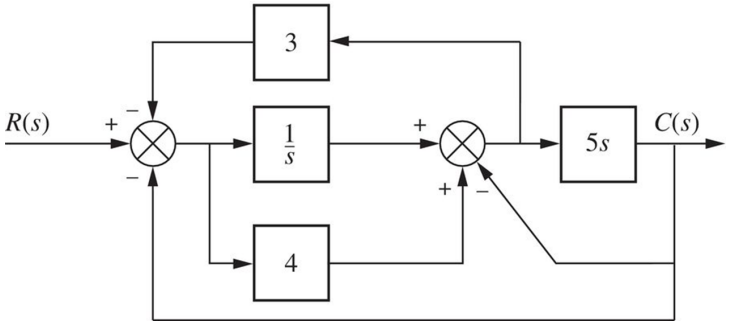

Figure P5.13

3. Chapter 5, Problem 13 (modified), *Control Systems Engineering*:
   Reduce the block diagram shown in Figure P5.13 (above) to a single transfer function, $T(s) = C(s)/R(s)$. Use block diagram reduction.

4. Chapter 5, Problem 13 (modified), *Control Systems Engineering*:
   Convert the block diagram shown in Figure P5.13 (above) to a signal-flow graph. Use Mason's gain formula to determine the closed-loop transfer function, $T(s) = C(s)/R(s)$.

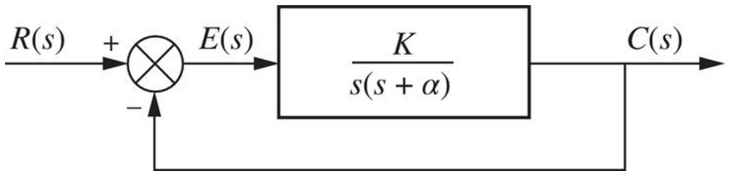

Figure P5.15

5. Chapter 5, Problem 15, *Control Systems Engineering*:
   For the system shown in Figure P5.15 (above), find K and α to yield a settling time of 0.12 second and a 20% overshoot.