

Due Tuesday, October 13

1. Problem 5.11 from the book. In part (a),  $d(t)$  is a step signal and  $r(t)$  is zero. In part (b),  $r(t)$  is a step signal and  $d(t)$  is zero.
  - (a) In order to do part (a), first find the transfer function from  $d(t)$  to  $c(t)$ . Part (a) is asking for the value of  $K$  that results in the steady-state output  $c_{ss}$  equal to 0.05, which is 1% of the value of  $d(t)$ .
  - (b) In order to do part (b), first find the transfer function from  $r(t)$  to  $c(t)$ . Part (b) is asking for the steady-state value of  $r(t) - c(t)$ , which is  $10 - c_{ss}$ .
  
2. Problem 5.13 (a)-(d) from the book.
  - (a) Hint: Write the relationship between  $C(s)$  and  $V(s)$  and take the inverse Laplace transform with zero initial conditions.
  - (b) This part is similar to 5.11(a).
  - (c) Note that system type is not affected by a disturbance input.
  - (d) Consider the final value theorem.
  - (e) Part (e) is a trick question. System type does not depend on the reference input.
  
3. Problem 5.14 from the book.