

Name _____ Mailbox _____

ECE-320, Quiz #2

Problems 1 and 2 refer to a system with poles at $-2+j$, $-2-j$, -4 , $-1+2j$, $-1-2j$, and -20

1) The best estimate of the settling time for this system is

- a) 4 seconds b) 2 seconds c) 1 second d) 0.2 seconds

2) The dominant pole(s) of this system are

- a) $-2+j$ and $-2-j$ b) $-1+2j$ and $-1-2j$ c) -4 d) -20

Problems 3 and 4 refer to the system described by the following transfer function

$$G(s) = \frac{bs + a}{(s + 2)(s + 4)}$$

3) For a zero steady state error for a step input, the value of a should be

- a) 0 b) 1 c) 2 d) 4 e) 6 f) 8

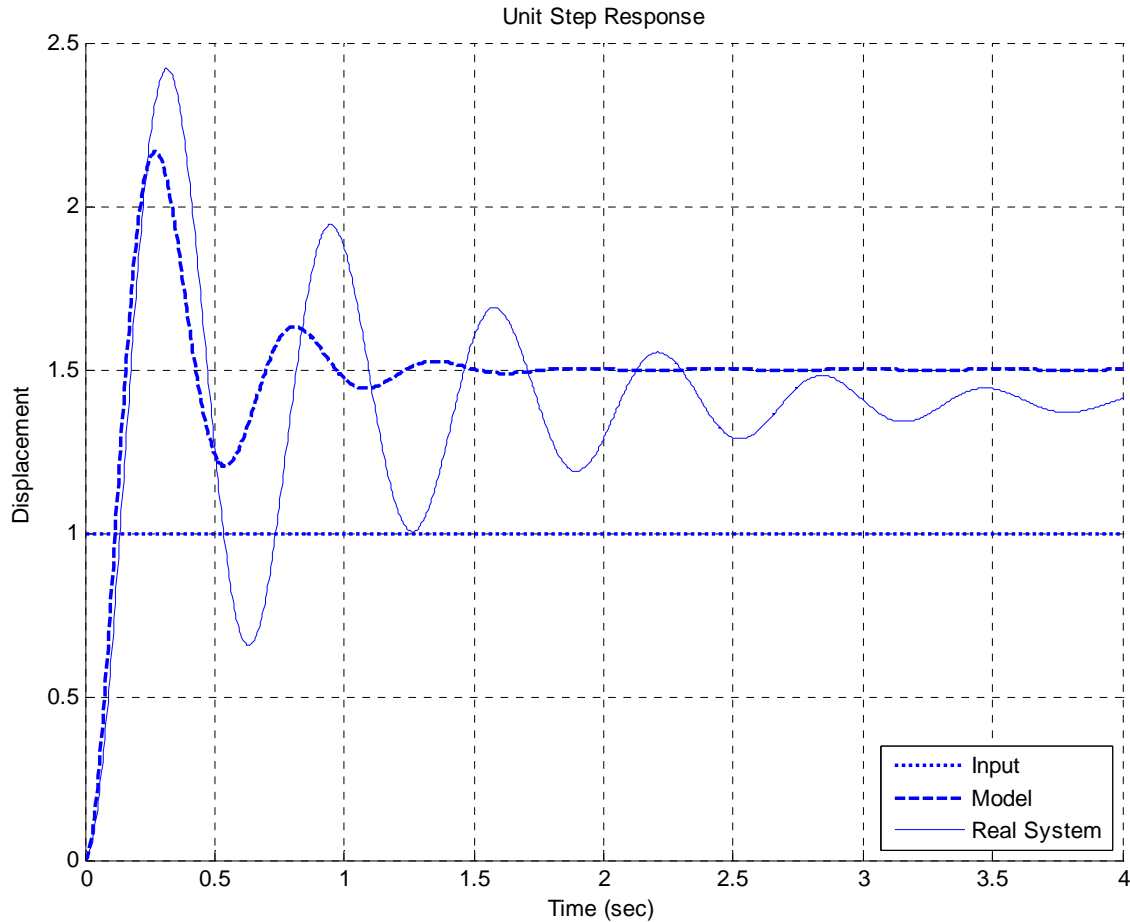
4) Assuming the value of a is chosen correctly, for a zero steady state error for a ramp input b should be chosen as

- a) 0 b) 1 c) 2 d) 4 e) 6 f) 8

Name _____

Mailbox _____

Problems 5-7 refer to the figure below, which shows the unit step response of a real 2nd order system and the unit step response of a second order model we are trying to match to the real system.



5) In order to make the model better match the real system, the *damping ratio* of the *model* should be

- a) increased
- b) decreased
- c) left alone
- d) impossible to determine

6) In order to make the model better match the real system, the *natural frequency* of the *model* should be

- a) increased
- b) decreased
- c) left alone
- d) impossible to determine

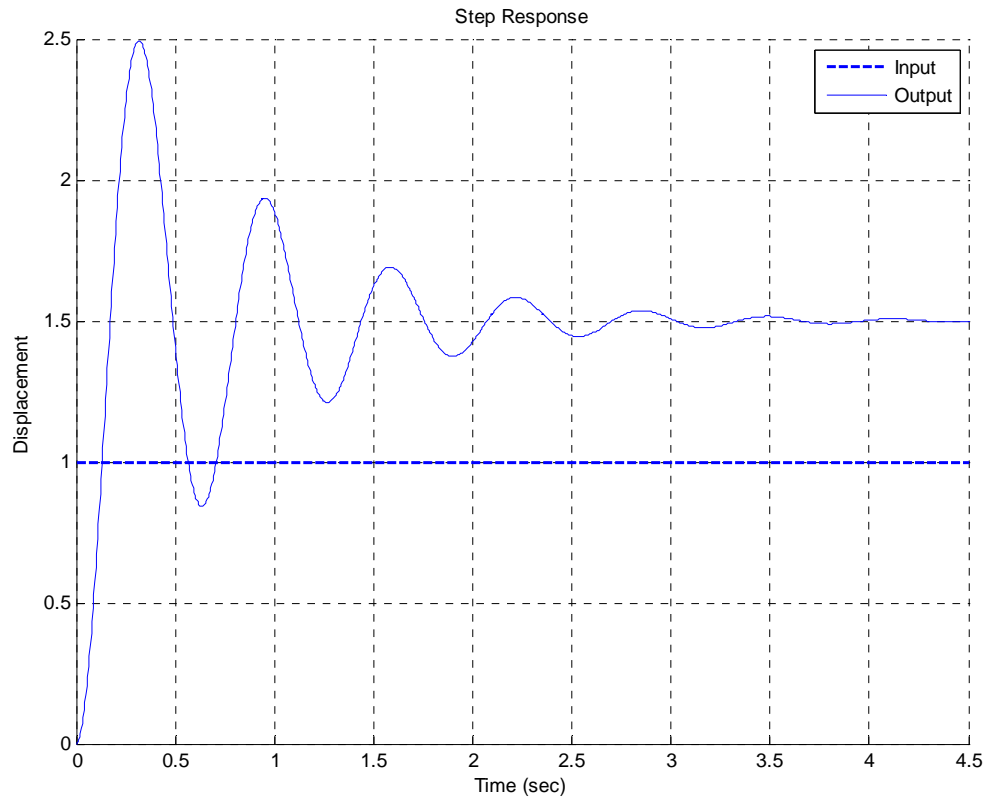
7) In order to make the model better match the real system, the *static gain* of the *model* should be

- a) increased
- b) decreased
- c) left alone
- d) impossible to determine

Name _____

Mailbox _____

Problems 8-10 refer to the **unit step response** of a system, shown below



8) The best estimate of the **steady state error** for a **unit step input** is

- a) 0.5 b) -0.5 c) 1.5 d) -1.5 e) none of these

9) The best estimate of the **steady state error** for a **unit ramp input** is

- a) 0.0 b) 0.25 c) ∞ d) impossible to determine

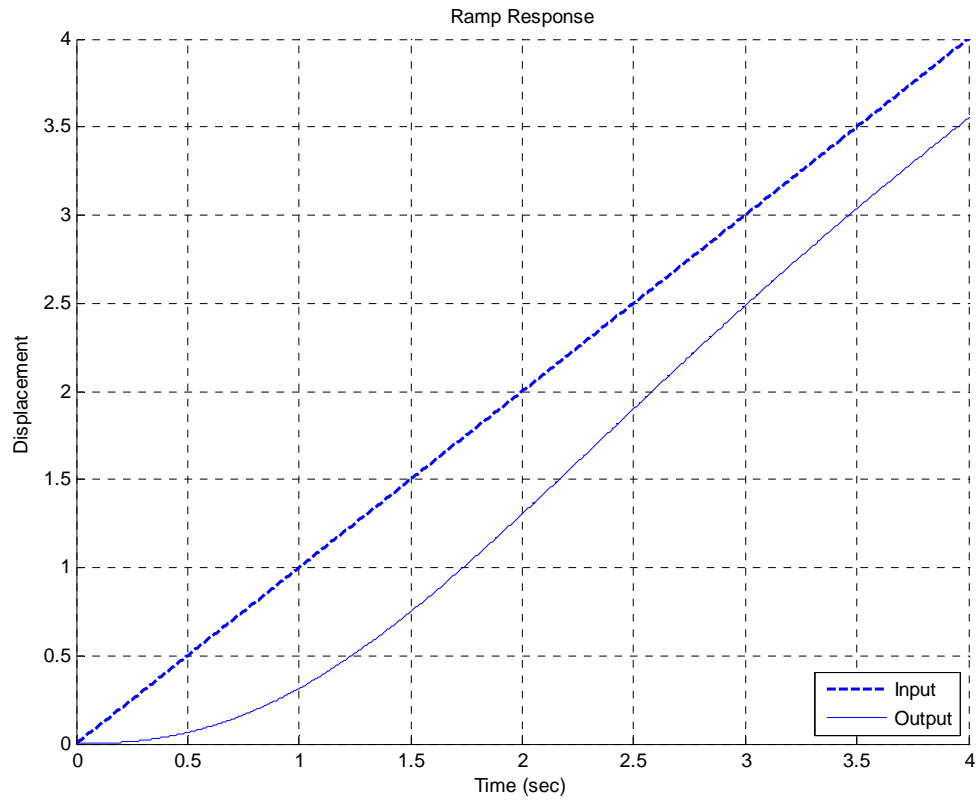
10) The best estimate of the **percent overshoot** is

- a) 200% b) 100% c) 67% d) 50% e) none of these

Name _____

Mailbox _____

Problems 11 and 12 refer to the unit ramp response of a system, shown below:



11) The best estimate of the steady state error is

- a) 0.5 b) -0.5 c) 0.8 d) -0.8 e) 0.0 f) none of these

12) The best estimate of the steady state error for a unit step is

- a) 1.0 b) 0.5 c) 0.0 d) ∞