Unit 5 - Week 1: Linear System Theory, Fourier and Laplace Transforms

Week-1 Assessment

The due date for submitting this assignment has passed. Due on 2018-08-15, 23:59 IST.
As per our records you have not submitted this assignment.

Week-1 Assessment

1)Following differential equation represents *1 point*

$$\frac{d^2x(t)}{dt^2} + \frac{tdx(t)}{dt} + 5x^2(t) = u(t)$$

- Linear Time Varying System
- Linear Time Invariant System
- Non-Linear Time Varying System
- Non-Linear Time Invariant System

No, the answer is incorrect.
Score: 0

Accepted Answers:
Non-Linear Time Varying System

2) The solution to the following homogenous differential equation is given by: *1 point*

$$\ddot{x}(t) + 7\dot{x}(t) + 12x(t) = 0$$

with initial conditions,

$$x(0) = 0, \dot{x}(0) = 12$$

- $12(e^{-3t} - e^{-4t})$
- $12(e^{3t} - e^{4t})$
- $12(e^{-3t} + e^{-4t})$
- $e^{-3t} - e^{-4t}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$12(e^{-3t} - e^{-4t})$

3) A unit step input is applied at time t=0 to a system which has the following input (u)-output (x) relationship:

$$\ddot{x}(t) + 7\dot{x}(t) + 12x(t) = 12u(t)$$
$$x(0) = 0, \dot{x}(0) = 12;$$

The response of the system at time t = 1 second (upto 2 decimal point) is given by

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 1.22 , 1.24

1 point

4) An LTI system has the impulse response h(t) given by $h(t) = e^{-t} - e^{-2t}$. The system is excited by input $u(t) = \delta(t-1) + \delta(t-2)$. The output of the system at t=3s is given by ***1 point***

- $e^{-1} - e^{-2}$
- $e^{-1} - e^{-4}$
- $e^{-2} - e^{-4}$
- $1 - e^{-2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$e^{-1} - e^{-4}$

5) The Laplace transform of the following signal is given by ***1 point***

No, the answer is incorrect.
Score: 0

Accepted Answers:

6) If the step response of LTI system is ***1 point***

$$y(t) = 1 - e^{-9t}(cos40t + 9/40(sin40t))$$

The transfer function of the system is given by

- $1681/(s^2 + 18s + 1681)$
- $169/(s^2 + 18s + 169)$
- $25/(s^2 + 18s + 25)$
- $1681/(s^2 + 180s + 1681)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$1681/(s^2 + 18s + 1681)$

7) The transfer function of a LTI system is given by $G(s) = 1/(s+1)$. The response of the system for unit ramp input given by ***1 point***

Week 12 Describing functions

Assignment solutions

$(t + e^{t} - 1)$

$(t + e^{-t} - 1)$

$(t + e^{-t} + 1)$

$(t + e^{-t})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(t + e^{-t} - 1)$

8) The transfer function of a system is given by $G(s) = (3s + 2)/(s^2 + s + 1)$ The system is initially at rest and is applied a unit step input at t = 0. If x(t) is the output, the value of dx/dt at t = 0 is, (Hint: use initial value theorem) *1 po*

- 2
- 5
- 1
- 3

No, the answer is incorrect.
Score: 0

Accepted Answers:
3

9) The transfer function of a system is given by $G(s) = s(5s + 4)/(s^3 + s + 1)$ The system is initially at rest and is applied a ramp input at t = 0. If x(t) is the output, the value of $x(\infty)$ ***0 points***

- 4
- 5
- 1
- 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
4

10) A second order system with unity DC gain and no zeros has a damping factor of $\xi = 0.2$ and an undamped natural frequency $\omega_n = 10$. The system is initially at rest and is applied a step input at t = 0. The value of the response x(t) at t=0.1s (upto 2 decimal point) is

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.39,0.41

1 point

Previous Page End