

Question 10/10 (3 p.)

Which of the following systems are linear?

Hint: Select all that apply

$y(t) = \sin(x(t))$

$y(t) = \cos(t)x(t)$

$y(t) = x(t) - 3$

$y(t) = e^{-x(t)}$

$y(t) = 2 \frac{d}{dt}(x(t))$



$y(t) = \int_{-\infty}^{t+1} x(\tau) d\tau$

What is the value of z such that $\cos(z) = 2$?

$z = -j \ln(\sqrt{2} - 3)$

$z = -j \ln(2 + \sqrt{3})$

$z = j \ln(\sqrt{2} + 3)$

$z = -j \ln(\sqrt{2} + 3)$

SUBMIT ANSWER

Which of the following signals are even signals?

Hint: Select all that apply

$x(t) = (t - 1)^2$

$x(t) = \frac{1}{t^2 + 1}$

$x(t) = 3$

$x(t) = -\sin(\cos(t))$

$x(t) = \text{rect}(t - 1)$

SUBMIT ANSWER

Let $x(t) = A\cos(\omega t + \theta) + B\cos(2\omega t + \beta)$, then the Power of the signal $x(t)$ is given by

$P_x = \frac{A^2 + B^2}{2}$

$P_x = \frac{(A^2 + B^2)\cos(\theta - \beta)}{2}$



$P_x = \frac{(A\cos(\theta) + B\cos(\beta))^2}{2}$

$P_x = \frac{(A + B)^2}{2}$

$P_x = \frac{(A + B)^2 - \cos(\theta - \beta)}{2}$

POWERUNIT

SUBMIT ANSWER

Find the impulse response of the LTI system described below

$$y(t) = \int_{t-T}^{t+T} x(\tau) d\tau$$

$h(t) = \text{rect}\left(\frac{2t}{T}\right)$

$h(t) = u(t - T) - u(t + T)$

$h(t) = \text{rect}\left(\frac{t}{2T}\right)$

$h(t) = \text{rect}\left(\frac{t}{T}\right)$

POWERUNIT

Let $x(t) = e^{(t-2)} \cdot u(t-2)$, then the derivative of $x(t)$ ($\frac{d}{dt}(x(t))$) is given by

$\frac{d}{dt}(x(t)) = e^{(t-2)} \cdot u(t-2) + u(t-2)$

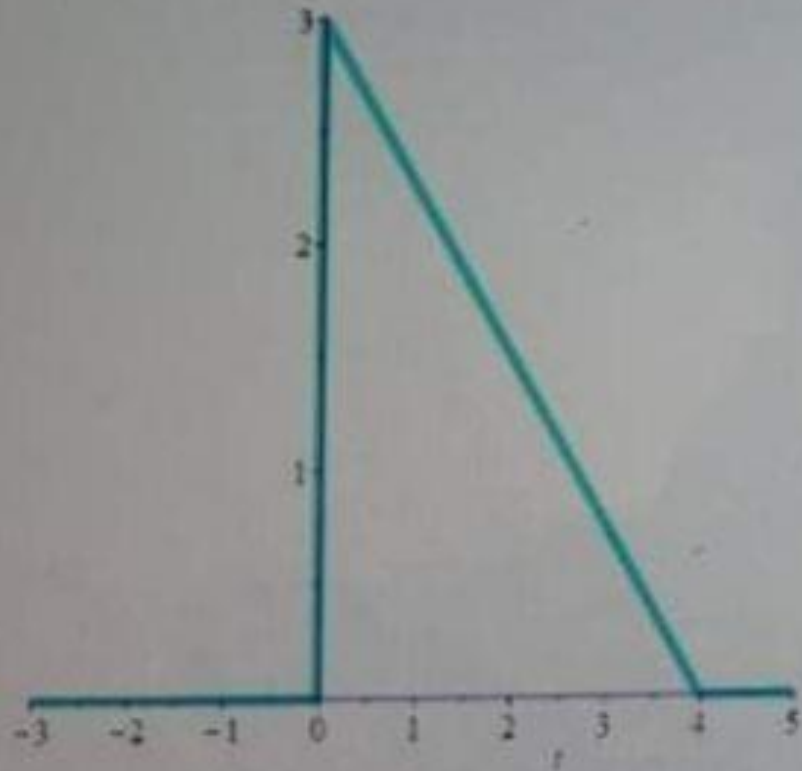
None of the choices

$\frac{d}{dt}(x(t)) = e^{(t-2)} \cdot u(t-2) + \delta(t-2)$

$\frac{d}{dt}(x(t)) = e^{(t-2)} \cdot u(t-2)$

$\frac{d}{dt}(x(t)) = e^{(t-2)} \cdot u(t-2) + e^{(t-2)}$

The energy of the signal $x(t)$ described below is equal to



Question 2/10 (3 p.)

Which of the following systems are BIBO stable?

Hint: Select all that apply

$y(t) = x^2(t)$

$y(t) = x(t)e^{-t}$

$y(t) = 2t \cdot \cos(x^2(t))$

$y(t) = \cos(t)x(t)$

$y(t) = e^t x(t)u(-t)$

SUBMIT ANSWER

Let $T\{x(t)\} = y(t)$ be an LTI system, where $T\{\sin(\pi t)\} = \cos(\pi t)$ and $T\{\cos(\pi t)\} = -\sin(\pi t)$.

Find

$$T\left\{\cos\left(\pi t + \frac{\pi}{4}\right)\right\}$$

- $-\frac{1}{\sqrt{2}}(\cos(\pi t) - \sin(\pi t))$
- $-\frac{1}{\sqrt{2}}(-\cos(\pi t) + \sin(\pi t))$
- $-\frac{1}{\sqrt{2}}(\cos(\pi t) + \sin(\pi t))$
- $\frac{1}{\sqrt{2}}(\cos(\pi t) + \sin(\pi t))$

SUBMIT ANSWER

POWERUNIT

Evaluate the integral below

$$\int_{-\infty}^t \delta(-3\tau + 6)(\tau^2 - 2) d\tau$$

0

$\frac{-2}{3}u(t-2)$

$\frac{2}{3}u(t-2)$

$\frac{2}{3}u(t+2)$

$\frac{-2}{3}u(t+2)$

