

Quiz 4

Fill in the following table with a Y (yes) or N (no) for each of the system models given. Assume $-\infty < t < \infty$ for all of the systems and all initial conditions are zero.

System	System Model	Linear?	Time-Invariant?	Causal?	Memoryless?
1	$y(t) = e^{t-1}x(t+1)$				
2	$y(t) = x\left(t - \frac{1}{2}\right)$				
3	$y(t) = x(1-t)$				
4	$\dot{y}(t) + y(t) = e^{-t}x(t)$				
5	$y(t) = \int_{-\infty}^t e^{-(t-\lambda)}x(\lambda+1)d\lambda$				
6	$y(t-1) = \cos(t)x(t)$				
7	$y(t) = x\left(\frac{t}{2}\right)$				
8	$y(t) = \frac{1}{2}[x(t-1) + x(t+1)]$				

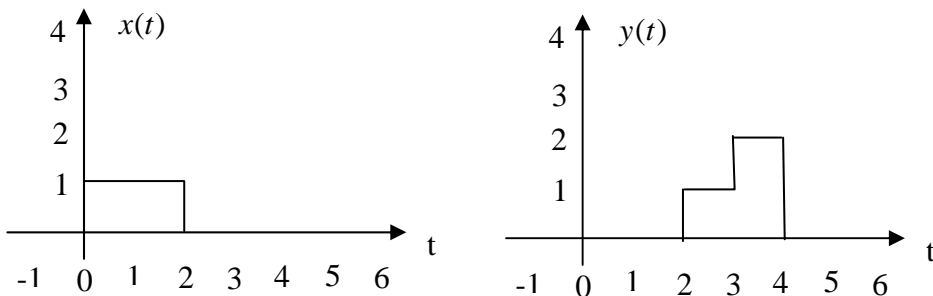
9) For a system with input $x(t)$ and output $y(t)$, is it necessary for $y(t_0) = 0$ in order for the system to be **linear**?

a) Yes b) No

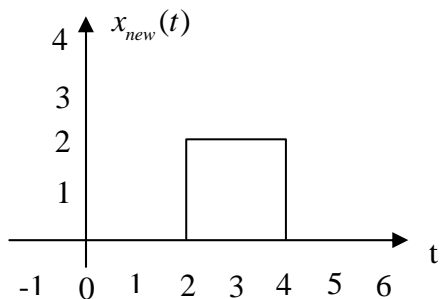
10) For a system with input $x(t)$ and output $y(t)$, is it necessary for $y(t_0) = 0$ in order for the system to be **time-invariant**?

a) Yes b) No

11) Assume we know a system is a linear time invariant (LTI) system. We also know the following input $x(t)$ – output $y(t)$ pair:



If the input to the system is now $x_{new}(t)$



Which of the following best represents the output of the system?

- a) $y_a(t)$ b) $y_b(t)$ c) $y_c(t)$ d) $y_d(t)$

