Assignment # 1

CLO-1, {Comprehension}.

We introduced a number of general properties of Systems, In particular a System may or may not be: (i) Memoryless (ii) Time Invariant (iii) Linear (iv) Causal. (v) Stable.

Determine which of these Properties hold and which do not hold for each of the following CTS & DTS. Justify your answers. In each example $y(t)$ & $y\{n\}$ denotes System O/P and $x(t)$ is the System I/P.

1. $y(t) = x(t-2) + x(2-t)$
2. $\{\cos(3t)\}\, x(t)$
3. $y(t) = \int_{-\infty}^{2t} x(\tau)\, d\tau$
4. $y(t) = x(t/3)$.
5. $y(t) = \frac{d\,x(t)}{dt}$.
6. $y\{n\} = x\{-n\}$.
7. $y\{n\} = x\{n-2\} - 2x\{n-8\}$.
8. $y\{n\} = n\, x\{n\}$.
9. $y\{n\} = x\{4n+1\}$.

Assignment #2

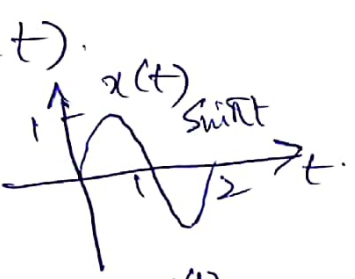
CLO-2, Analysis.

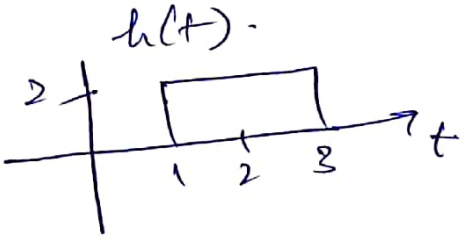
For each of the following pairs of waveforms, use the convolution integral to analyse the response $y(t)$ of the LTI system with impulse response $h(t)$ to the input $x(t)$. Implement and sketch your results in MATLAB.

a) $x(t) = e^{-\alpha t}u(t)$
$h(t) = e^{-\beta t}u(t)$
(Do this both when $\alpha \neq \beta$ and when $\alpha = \beta$)

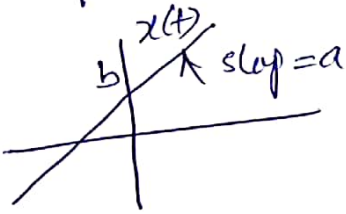
b) $x(t) = u(t) - 2u(t-2) + u(t-5)$.
$h(t) = e^{2t}u(1-t)$.

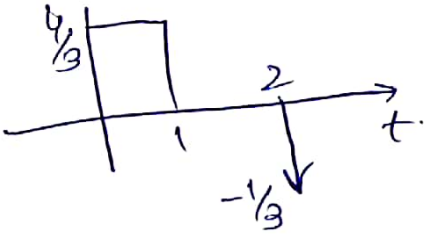
c) $x(t)$ and $h(t)$





d) $x(t)$ and $h(t)$





e) $x(t)$ and $h(t)$