DSP HW2

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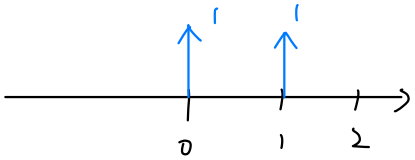
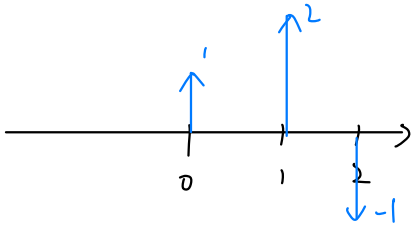
(a)

① $y[n] = x[n] * h_1[n] * h_2[n] * h_3[n]$

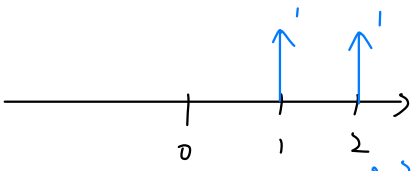
$h_1[n] \Rightarrow$



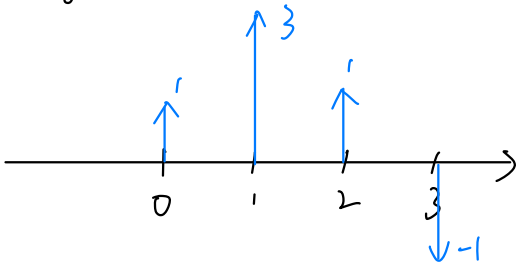
$h_2[n] \Rightarrow$



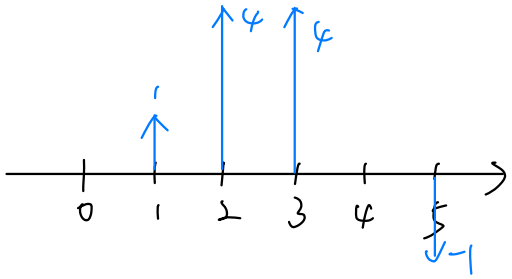
$h_3[n] \Rightarrow$



$h_1[n] * h_2[n] \Rightarrow$



$h_1[n] * h_2[n] * h_3[n] \Rightarrow$



impulse respose of the system

(b) let $h[n] = h_1[n] * h_2[n] * h_3[n]$

$y[n] = x[n] * h[n]$ and $h[n]$ is finite impulse response

$y[n]$ is FIR

$y[n] = x[n-1] + 4x[n-2] + 4x[n-3] - x[n-5]$, there is no $a_k y[n-k]$ on the right side of equal sign, so # $y[n]$ is not IIR

(2) (c) frequency response $H(e^{jw}) = \sum_{k=-\infty}^{\infty} h[k] e^{-jwk}$

$= e^{-jw} + 4e^{-2jw} + 4e^{-3jw} - e^{-5jw}$ #

(d) since $h[n] = 0 \quad \forall n \in \mathbb{Z}^-$

$y[n] = \sum_{k=-\infty}^{\infty} h[k] x[n-k] = \sum_{k=0}^{\infty} h[k] x[n-k]$

it's causal system