HW2

Friday, September 10, 2021 1:17 PM

2. $y[n] = 10x[n]\cos(0.25n + \theta)$

a. y is linear, input doesn't multiply by itself.

b. y is not time invariant, input multiplies by $\cos(0.25n + \theta)$ which depends on n

c. y is causal, doesn't depend on future input

d. let $x[n] = B_x$, $y[n] = B_y$ for all n

then $B_y = 10 B_x \cos(0.25n + \theta)$

$\max(|10 B_x \cos(0.25n + \theta)|) = 10 B_x < \infty$

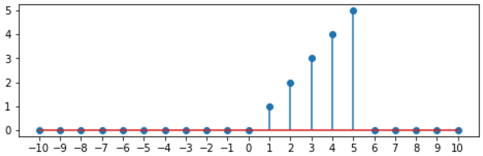
$\therefore$ y is stable

3. $x[n] = \{0, 1, 2, 3, 4, 5\}$

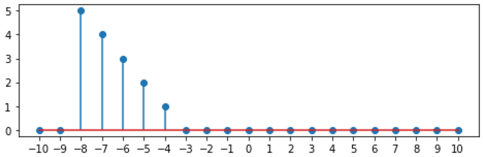
a. $y_1[n] = x[-n - 3]$

b. $y_2[n] = x[-(n-3)] = x[-n + 3]$

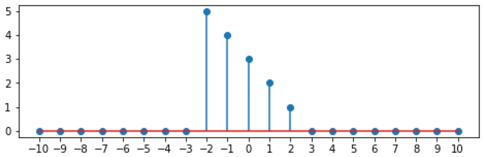
x



y_1



y_2



y_1 and y_2 are different signals.

y_1 correctly represents $x[-n-3]$.

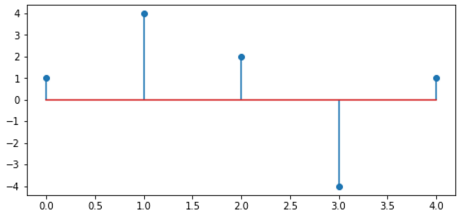
4.

	Linear	T.I.	Stable	Causal
$x[\ \ ]$	yes	yes	yes	no

$x[-n]$	yes	yes	yes	no (for $n<0$)
$x[n]-x[n-1]$	yes	yes	yes	yes
round($x[n]$)	yes	yes	yes	yes

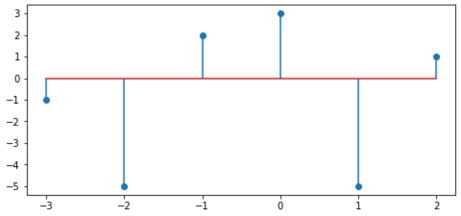
5.

a.



$x[n] * h[n] = \{1, 4, 2, -4, 1\}$ (↑ at 1)

b.



$x[n] * h[n] = \{-1, -5, 2, 3, -5, 1\}$ (↑ at 3)