

Quiz-1

Abhiroop Chintalpudi - AI10BTECH11005

Download all python codes from

<https://github.com/abhiroopchintalapudi03/EE3900/QUIZ-1/codes>

and latex-tikz codes from

<https://github.com/abhiroopchintalapudi03/EE3900/QUIZ-1>

$$y[5] = h[1] + h[2] + h[3] + h[4] + h[5]$$

$$\Rightarrow y[5] = -1$$

Similarly,

$$y[6] = -2$$

$$y[7] = -3$$

$$y[8] = -4$$

$$y[9] = -2$$

$$y[10] = 0$$

$y[n] = 0$ (for all $n > 10$ since all $h[n]$ becomes 0)

Plotting the output.

1 PROBLEM

The impulse response of a linear time-variant system is shown in figure P2.24 – 1. Determine and carefully sketch the response system to the input $x[n] = u[n - 4]$

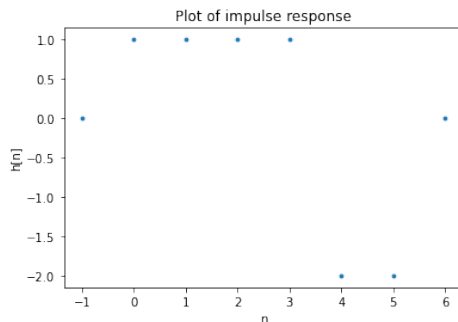


Fig. 0

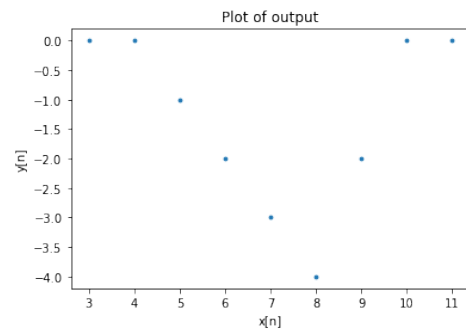


Fig. 0

2 SOLUTION

From given graph (0) we know that, Impulse response $h[n] = 0$, for all $n < 0$

$$h[0] = 1, h[1] = 1, h[2] = 1, h[3] = 1, h[4] = -2, h[5] = -2$$

$$h[n] = 0 \text{ for all } n > 5$$

And input $x[n] = u[n - 4]$

From convolution sum we know that,

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

$$\Rightarrow y[n] = \sum_{k=-\infty}^{\infty} u[n-4]h[n-k]$$

$$\Rightarrow y[n] = \sum_{k=4}^{\infty} u[n-4]h[n-k]$$

$$\Rightarrow (\forall n \leq 4) y[n] = h[0] + h[1] + h[2] + h[3] + h[4] + h[5] = 0 \text{ (since all other } h[n] \text{ are 0)}$$

$$\Rightarrow y[n] = 1 + 1 + 1 + 1 + (-2) + (-2) \text{ (for all } n \leq 4)$$