Exam-1

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1 PROBLEM

(Q 2.22 a) For each of the pairs of sequences in following figure, use discrete convolution to find the response to the input $x[n]$ of the linear time-invariant system with impulse response $h[n]$
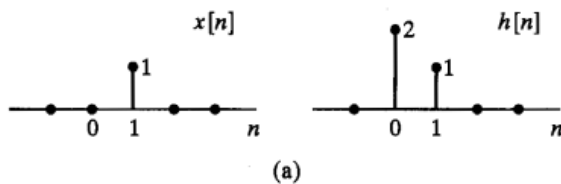

Fig. 0: Given Plot

2 SOLUTION

$$y[n] = x[n] * h[n] \tag{2.0.1}$$

$$= \sum_{k=-\infty}^{\infty} x[k]h[n-k] \tag{2.0.2}$$

From the input signal figure

$$x[n] = \delta[n-1] \tag{2.0.3}$$
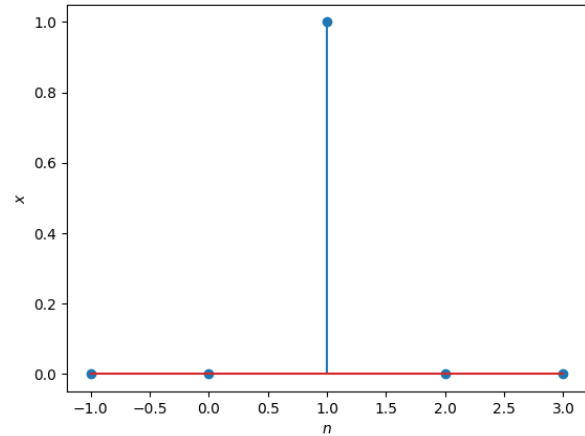
The plot of $x[n]$ is given below

Fig. 0: plot of x

The plot of $h[n]$ is given below
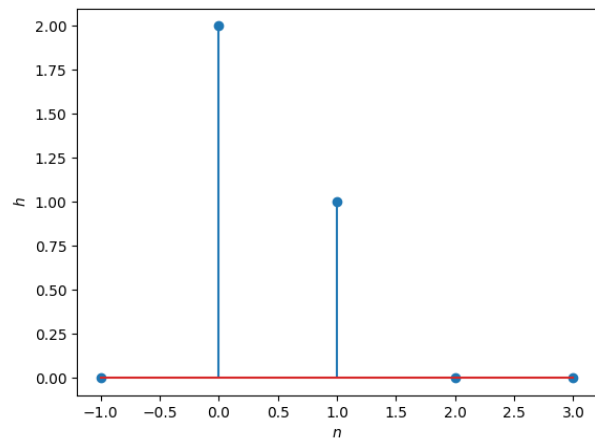

Fig. 0: plot of h

from (2.0.1) and (2.0.3), we get

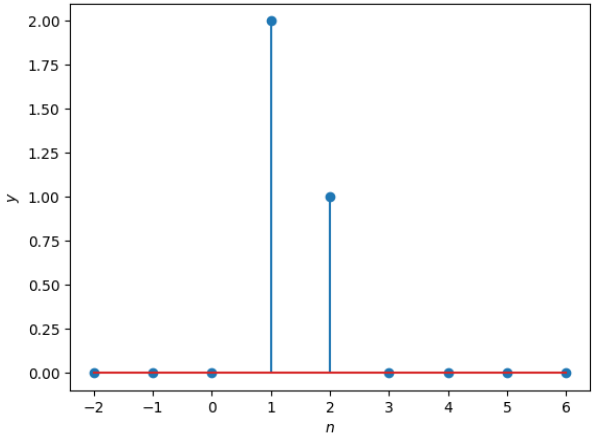$$y[n] = \delta[n-1] * h[n] \tag{2.0.4}$$

$$= h[n-1] \tag{2.0.5}$$

Fig. 0: plot of *y*