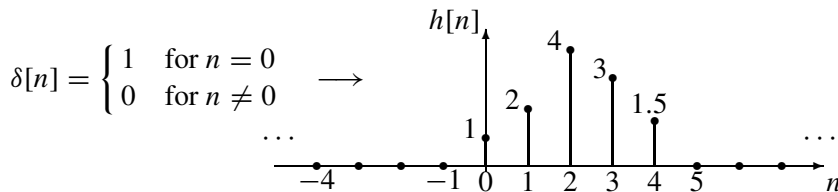## PROBLEM:

Answer the following questions about the time-domain response of FIR digital filters:

$$y[n] = \sum_{k=0}^{M} b_k\, x[n-k]$$

(a) When tested with an input signal that is an impulse, $x[n] = \delta[n]$, the observed output from the filter is the signal $h[n]$ shown below:

$$\delta[n] = \begin{cases} 1 & \text{for } n = 0 \\ 0 & \text{for } n \neq 0 \end{cases} \longrightarrow$$



Determine the filter coefficients $\{b_k\}$ of the difference equation for the FIR filter.

(b) Is the filter *causal?*

(c) If the input signal is

$$x[n] = \begin{cases} 0 & \text{for } n < -2 \\ 1 & \text{for } n = -2, -1, 0, 1, 2 \\ 0 & \text{for } n > 2 \end{cases}$$

use convolution to determine the output signal $y[n]$ for all $n$. Give your answer as either a plot or a table of values.