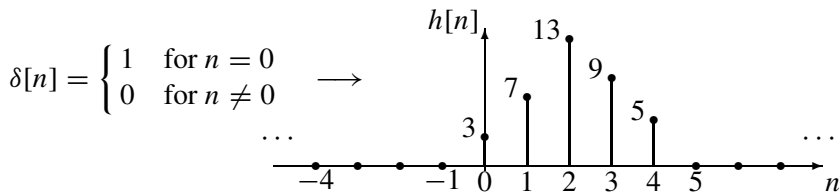


**PROBLEM:**

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:



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

- (b) If the filter coefficients are  $\{b_k\} = \{13, -13, 13\}$  and the input signal is

$$x[n] = \begin{cases} 0 & \text{for } n \text{ even} \\ 1 & \text{for } n \text{ odd} \end{cases}$$

determine the output signal  $y[n]$  for all  $n$ . Give your answer as either a plot or a formula.