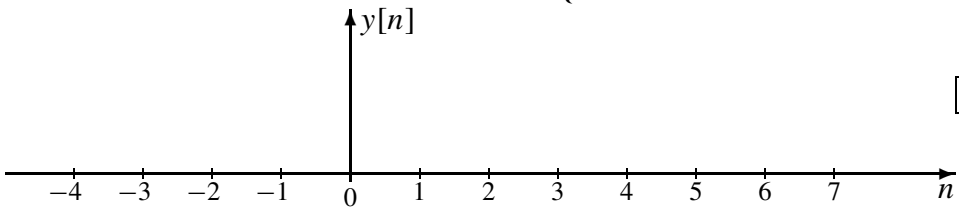
PROBLEM:

(a) If the filter coefficients of an FIR filter are $\{b_k\} = \{2, 0, -4, 0, 2\}$, make a plot of the output when the input is the unit step signal: $x[n] = u[n] = \begin{cases} 0 & \text{for } n < 0 \\ 1 & \text{for } n \geq 0 \end{cases}$



Plot zero values also

(b) Suppose that the frequency response of a different FIR filter is

$$\mathcal{H}(\hat{\omega}) = (\cos(2\hat{\omega}) - \cos\hat{\omega})\, e^{-j3\hat{\omega}}$$

If the input signal is $x[n] = 2 + 5\cos(0.25\pi n - 0.1\pi)$ for $-\infty < n < \infty$, determine a simple mathematical expression for the output signal $y[n]$.

$y[n] =$