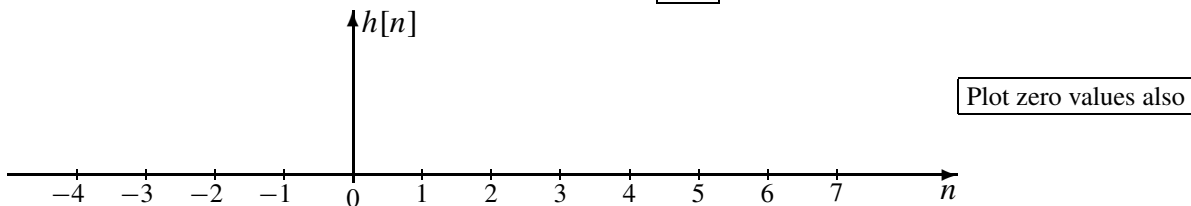


**PROBLEM:**

The following FIR filter is specified by the filter coefficients  $\{b_k\} = \{2, 0, -4, 0, 2\}$



- (a) Determine the impulse response: give your answer as a plot of  $h[n]$  vs.  $n$ .



- (b) Determine the frequency response,  $\mathcal{H}(\hat{\omega})$ , and select one of the following as the correct answer:

**(A)**  $(4 - 4 \cos(2\hat{\omega}))e^{-j(2\hat{\omega}-\pi)}$     **(B)**  $2 \cos \hat{\omega} + 4e^{-j(2\hat{\omega}+\pi)}$     **(C)**  $(4 \cos(2\hat{\omega}) - 4)e^{-j\hat{\omega}}$   
**(D)**  $2 \cos(2\hat{\omega}) - 4$

- (c) Determine the magnitude of  $\mathcal{H}(\hat{\omega})$  and present your answer as a plot of the magnitude vs. frequency. Label important features.

