

PROBLEM:

A linear time-invariant system is described by the difference equation

$$y[n] = 2x[n] + 4x[n - 1] - 3x[n - 2] + 3x[n - 3] - 4x[n - 4] - 2x[n - 5]$$

- Write a simple formula for the magnitude of the frequency response $|H(e^{j\hat{\omega}})|$. Take advantage of the *odd symmetry* of the filter coefficients (i.e., $b_0 = -b_5$, $b_1 = -b_4$, etc.) to express your answer in terms of real-valued functions only.
- Derive a simple formula for the phase of the frequency response $\angle H(e^{j\hat{\omega}})$.
- Determine the impulse response $h[n]$, and plot $h[n]$ as a function of n .