## PROBLEM:

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

$$y[n] = 2x[n] + 4x[n-1] - 3x[n-2] + x[n-3] - 3x[n-4] + 4x[n-5] + 2x[n-6]$$

(a) Write a simple formula for the magnitude of the frequency response $|H(e^{j\hat{\omega}})|$. Express your answer in terms of real-valued functions only.

(b) Derive a simple formula for the phase of the frequency response $\angle H(e^{j\hat{\omega}})$.

(c) *Impulse Response:* Determine the response of this system to a unit impulse input; i.e., find the output $y[n] = h[n]$ when the input is $x[n] = \delta[n]$. Plot $h[n]$ as a function of $n$.