

PROBLEM:

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

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

- (a) *Impulse Response:* Determine the impulse response of this system. Plot $h[n]$ as a function of n .
- (b) When the input to the system is $x[n] = \exp(j\pi n/4)$ determine the functional form for the output signal $y[n]$. Find numerical values for the magnitude and phase.
- (c) What is the output if the input is

$$x[n] = 4 + \cos[0.5\pi(n - 1)] - 3 \cos[0.25\pi n]$$