

## PROBLEM:

The following MATLAB code will compute a time response and the frequency response of a digital filter:

```
bb = [ 1  0  -1 ];
xn = [ zeros(1,3), ones(1,4), zeros(1,3) ];
yn = conv( bb, xn );
subplot(2,1,1), stem( [0:9], yn(1:10) );    %--- TIME RESPONSE
w = -pi : (pi/100) : pi;
H = freqz( bb, 1, w );
subplot(2,1,2), plot( w, abs(H) )          %--- FREQUENCY RESPONSE
```

- (a) Make the plot of  $y_n$  that will be done by the MATLAB `stem` function (in line #4).
- (b) Again referring to the MATLAB code above, make the plot of the magnitude response versus  $\hat{\omega}$  over the range  $-\pi \leq \hat{\omega} \leq \pi$ . Justify by giving a simple formula for the frequency response  $H(e^{j\hat{\omega}})$ .