

PROBLEM:

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

```
bb = [ 1 ];      aa = [ 1    0.5 ];  
xn = [ ones(1,3), zeros(1,5) ];  
yn = filter( bb, aa, xn );  
subplot(2,1,1), stem( [0:7], yn );      %--- TIME RESPONSE  
w = -pi : (pi/100) : pi;  
H = freqz( bb, aa, 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 $H(e^{j\hat{\omega}})$.