Lab report-9

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1)

a)function code:

```
function B=myLPF(A,w0_FS,wc)
N=(length(A)-1)/2;
B=zeros(size(A));
for k=-N:N
    if abs(k*w0_FS)<=wc
        B(k+N+1)=A(k+N+1);
    else
        B(k+N+1)=0;
    end
end
end
```

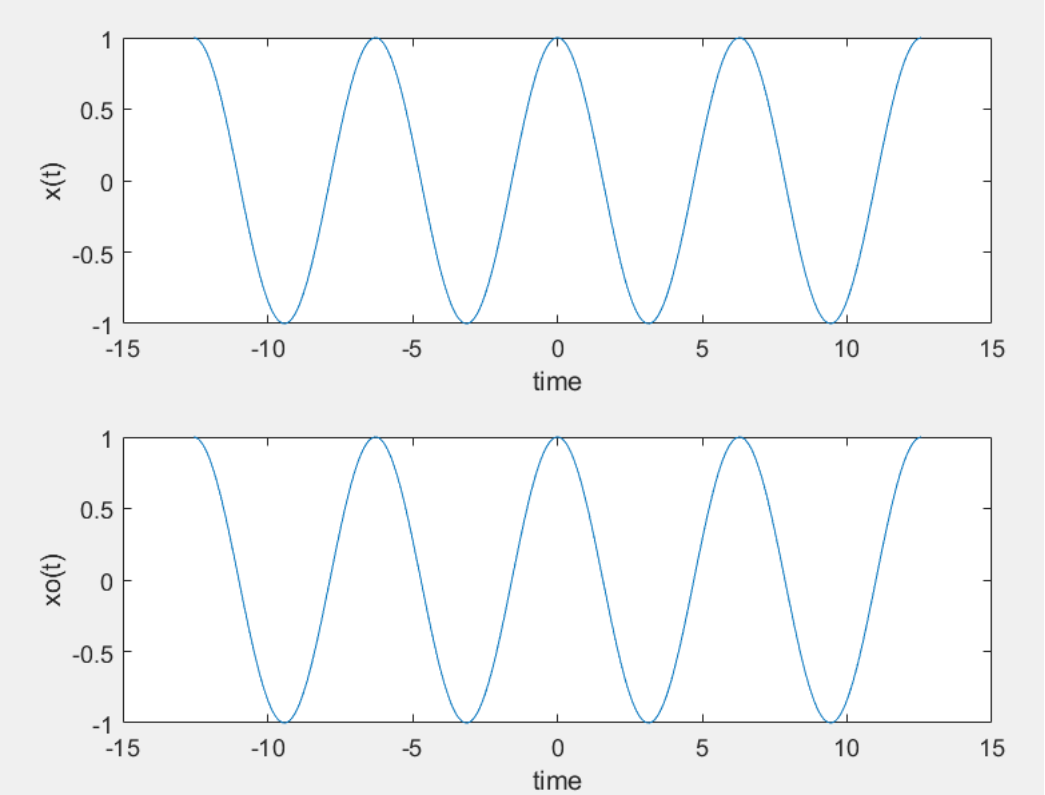
b)

code:

```
w0=1;
T=2*pi;
t=-2*T:0.01:2*T;
% xt=cos(t);
wc=2;
A = [1/2,0,1/2];
xt=partialfouriersum(A,T,t);
B=myLPF(A,w0,wc);
xo=partialfouriersum(B,T,t);

figure;

subplot(2,1,1);
plot(t,xt);
xlabel('time');
ylabel('x(t)');

subplot(2,1,2);
plot(t,xo);
xlabel('time');
ylabel('xo(t)');

```

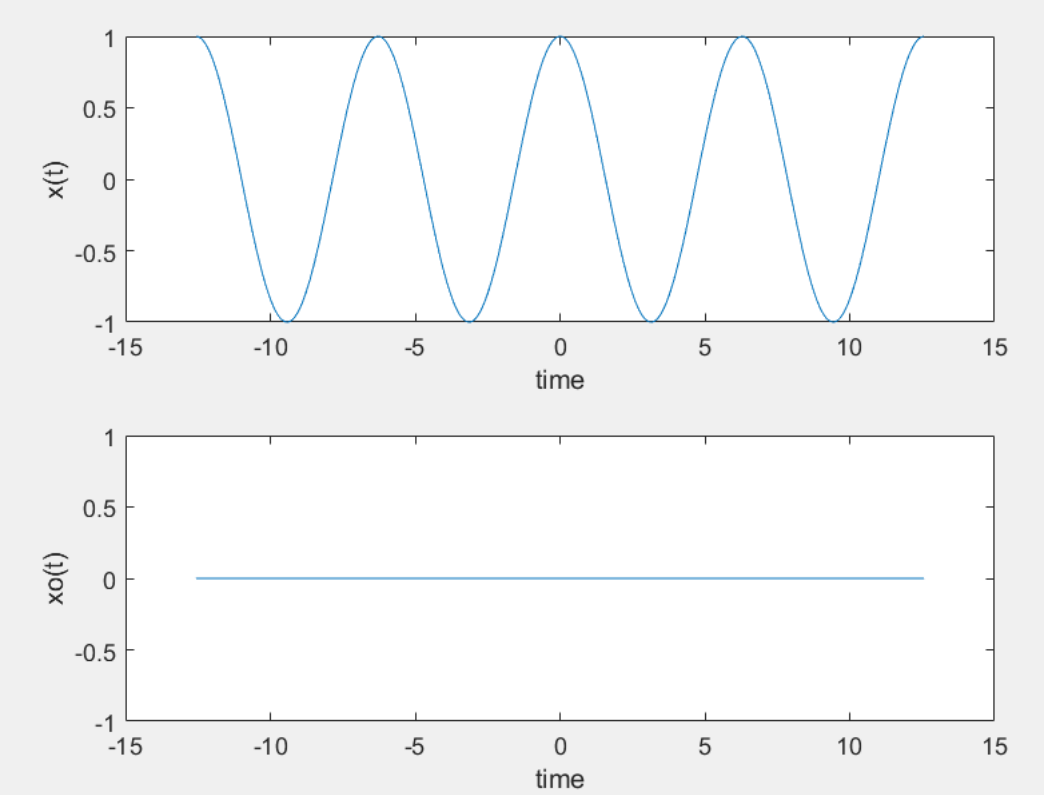
Plot:

When wc=2



When wc=0.5

Plot:

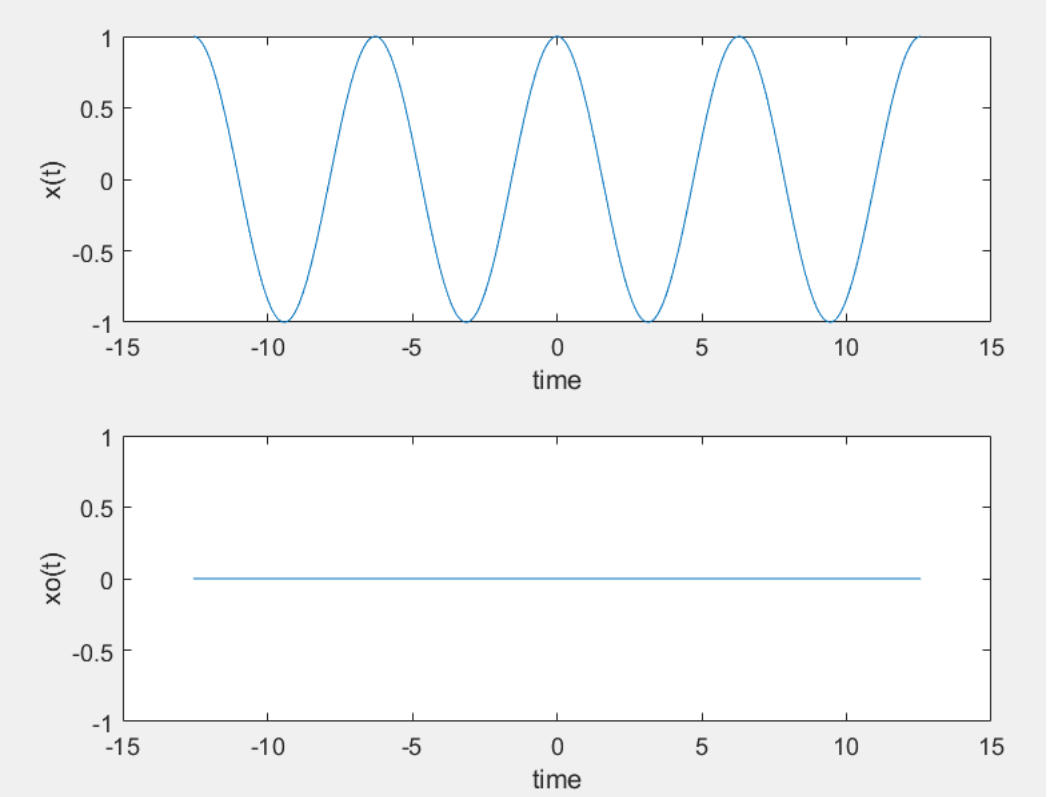


c)

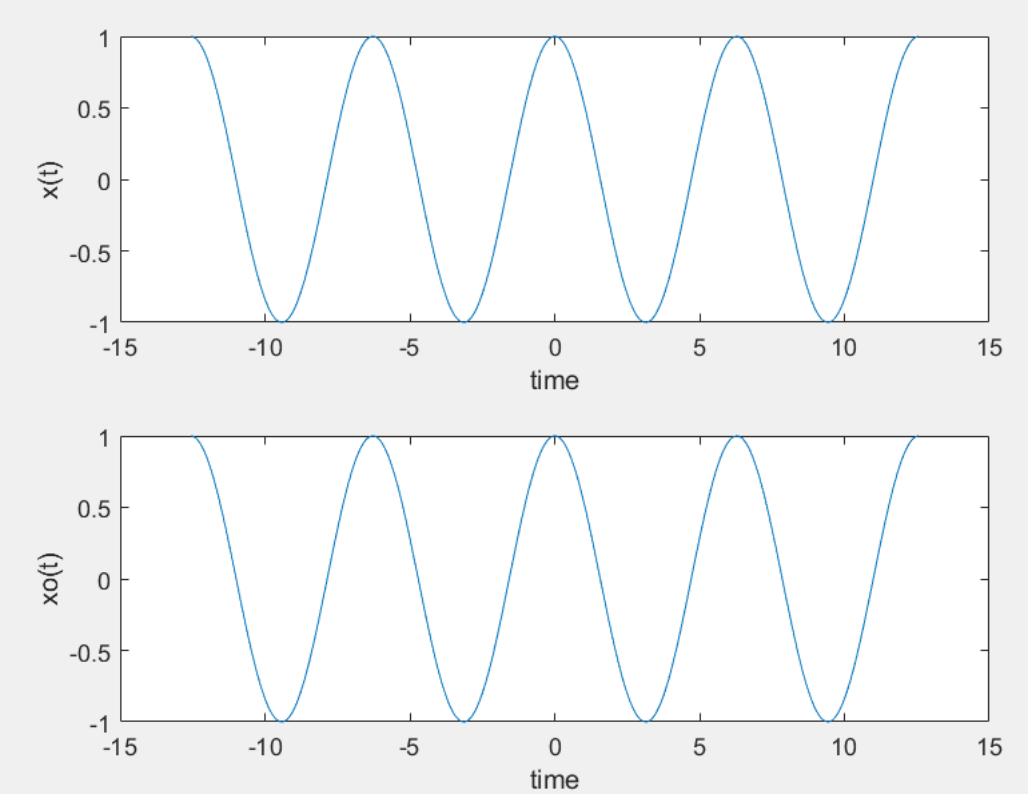
function code:

```
function B=myHPF(A,w0_FS,wc)
N=(length(A)-1)/2;
B=zeros(size(A));
for k=-N:N
    if abs(k*w0_FS)>wc
        B(k+N+1)=A(k+N+1);
    else
        B(k+N+1)=0;
    end
end
end
```

when wc=2



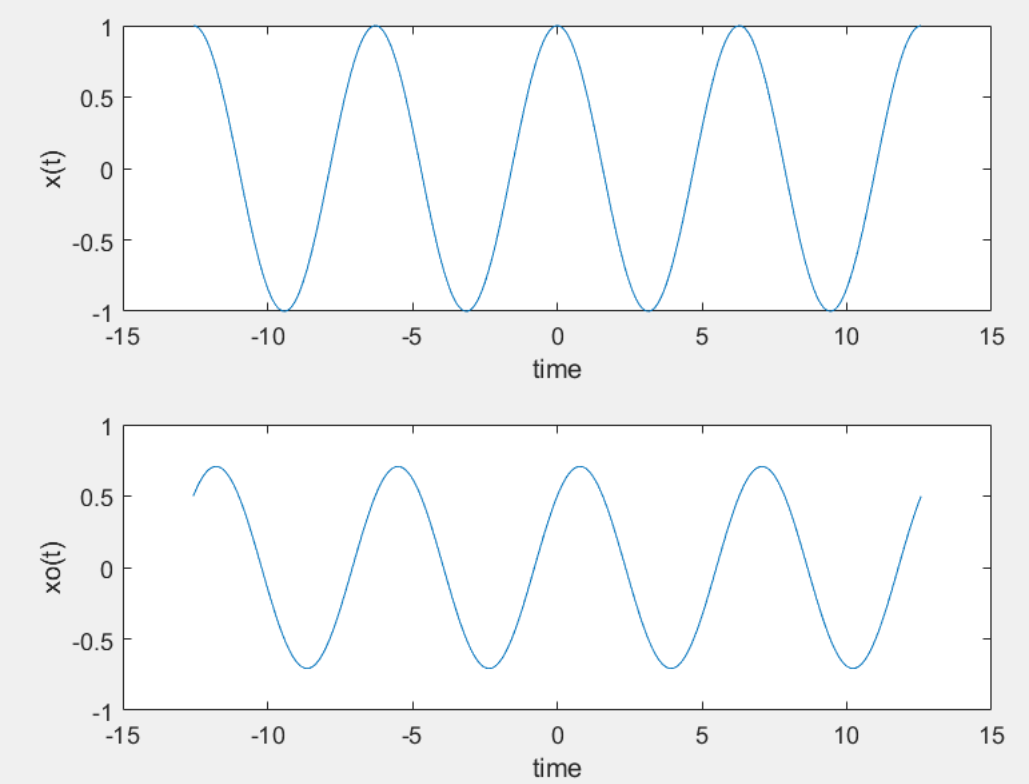
When wc=0.5



d)function code:

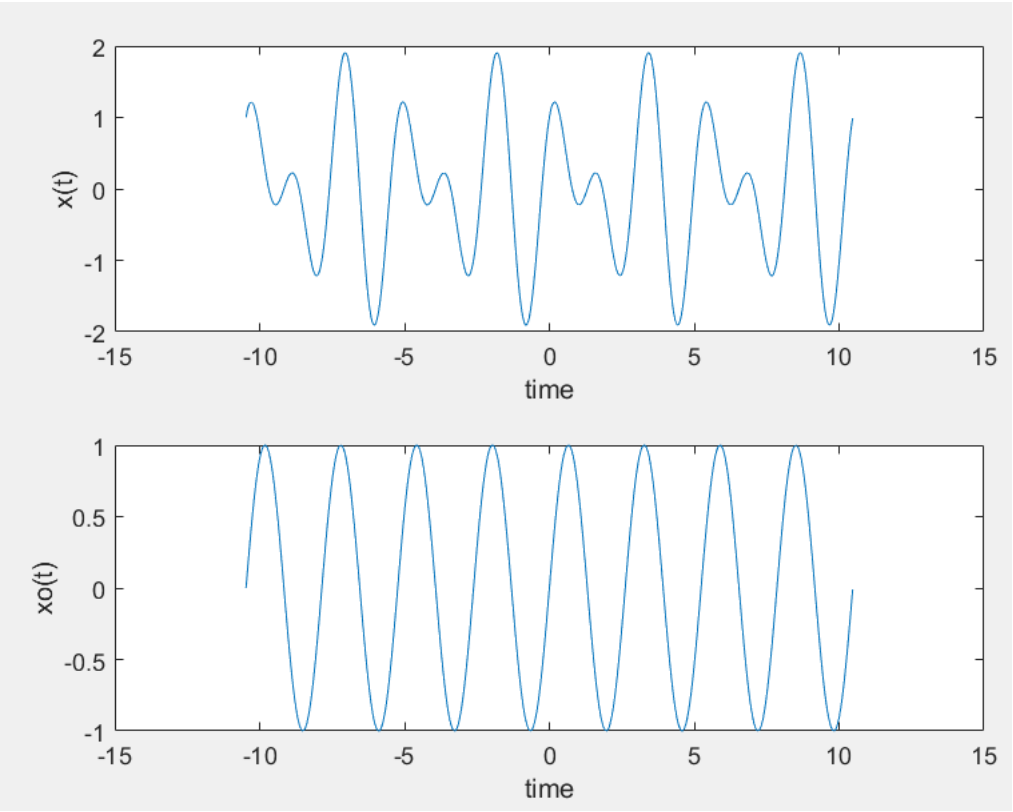
```
function B = NonIdeal(A,w0_FS,G,a)
N=(length(A)-1)/2;
B=zeros(size(A));
for k=-N:N
    B(k+N+1)=G/(a+1i*k*w0_FS)*A(k+N+1);
end
end
```

Plot:

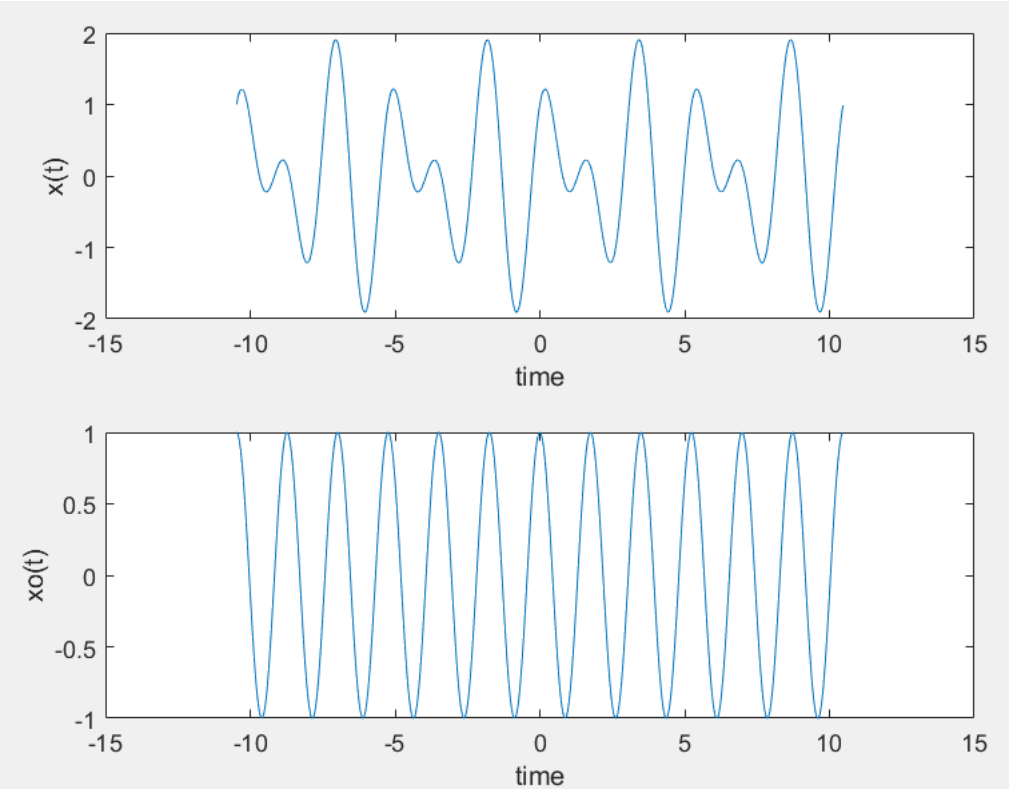


e)

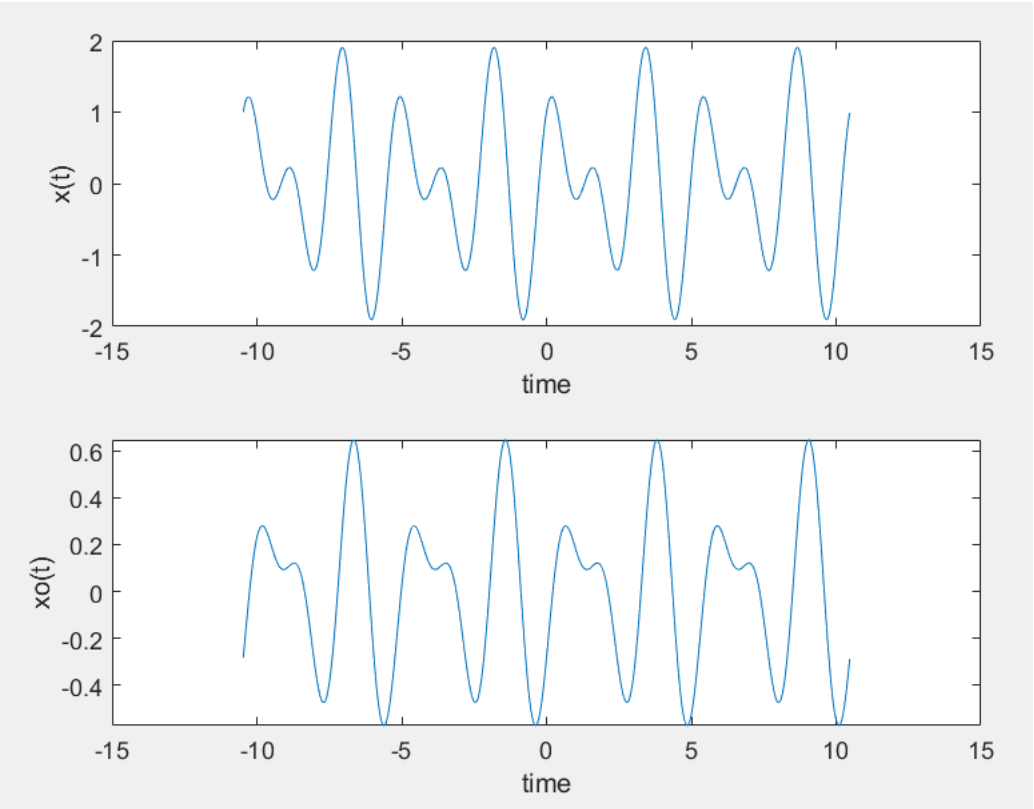
when the low pass filter is used



when the High pass filter is used



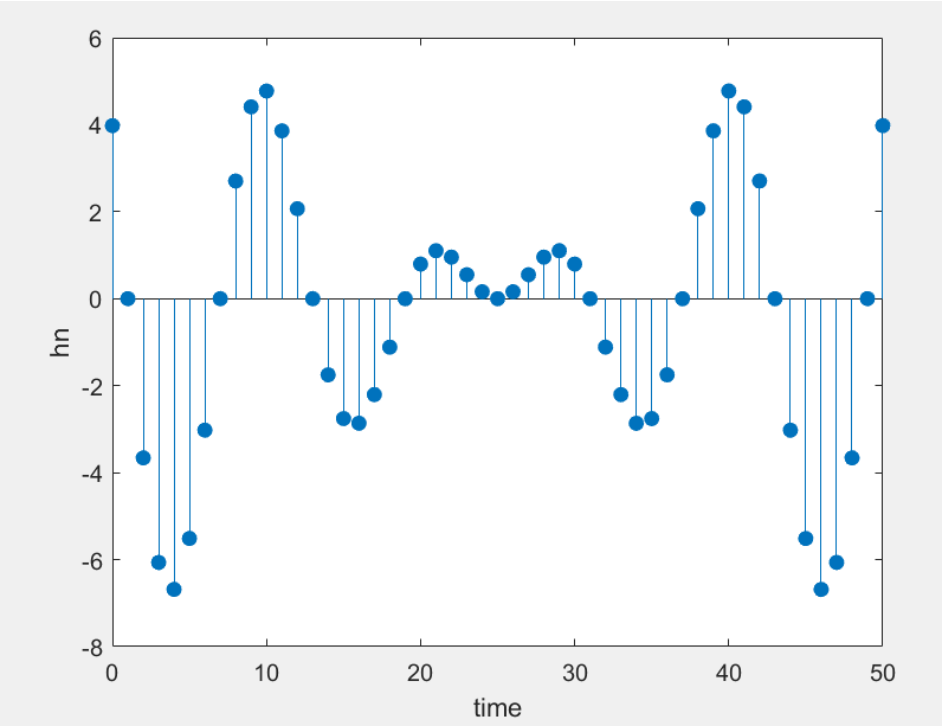
When Non-Ideal filter is used



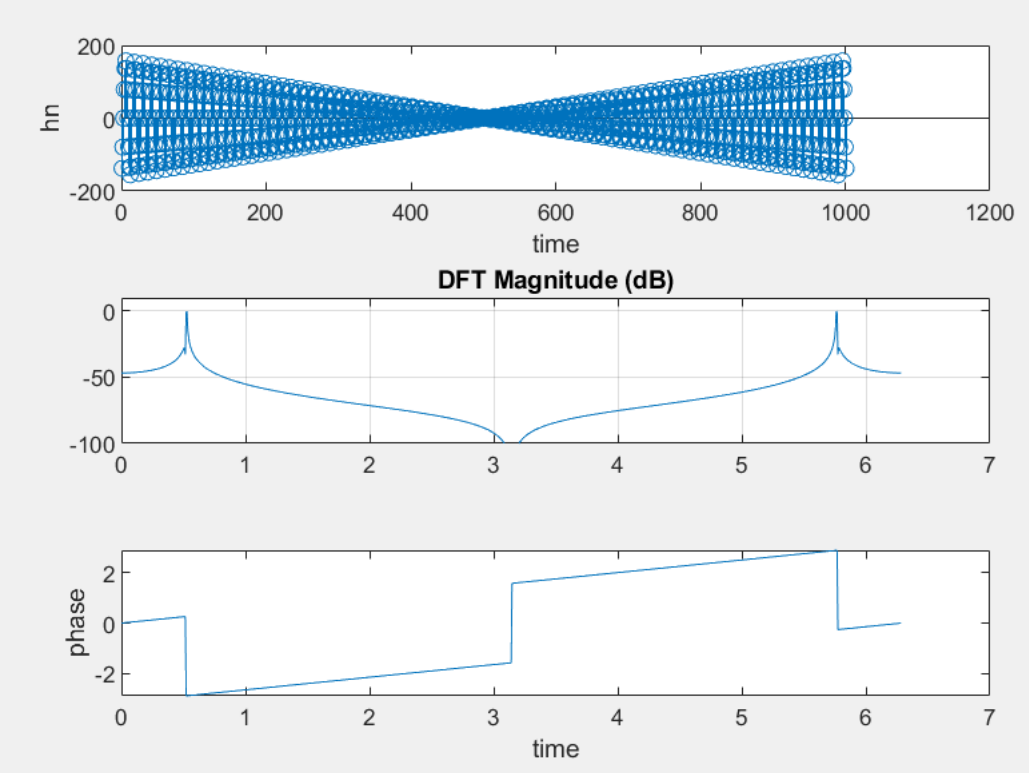
2)

a)

Plot for the coefficients of the h[n]

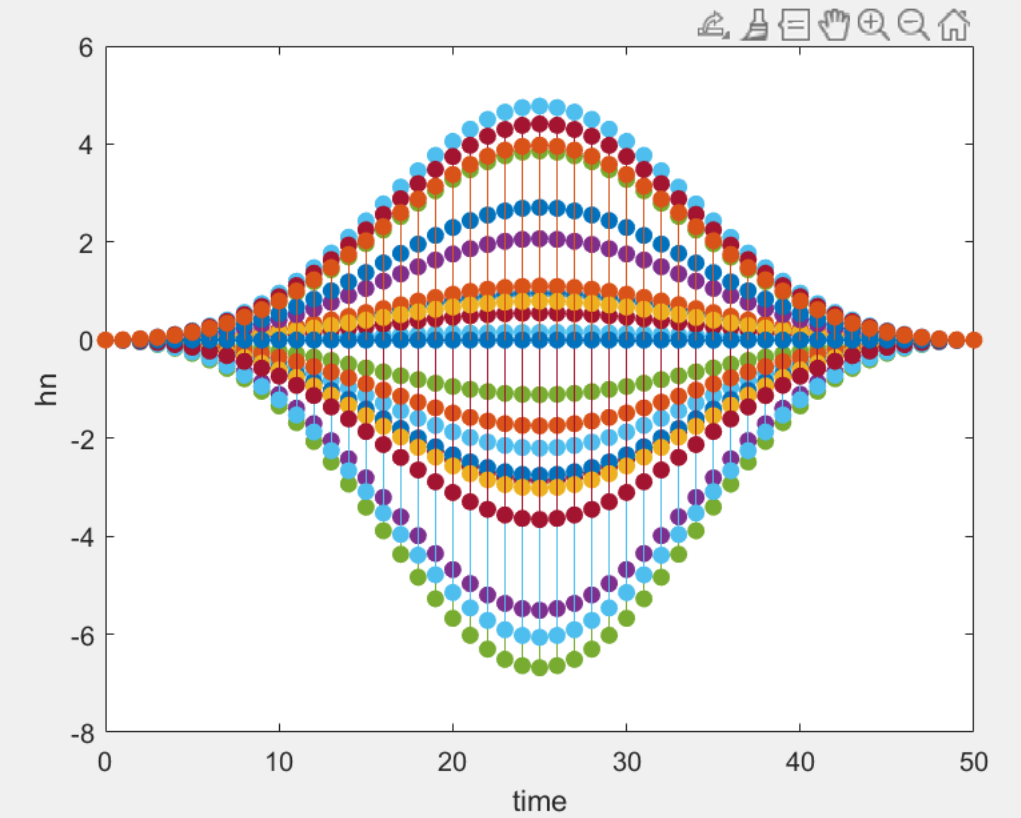


b)when the Rectangular window is used



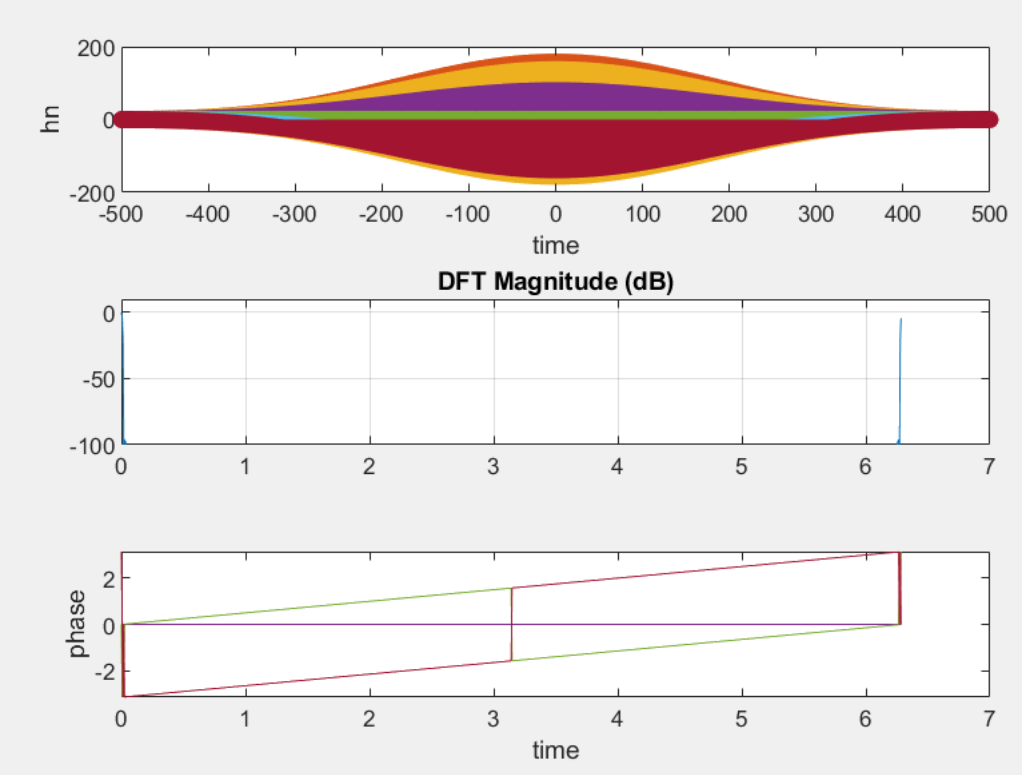
c)when the Blackman window is used

for 51 point:



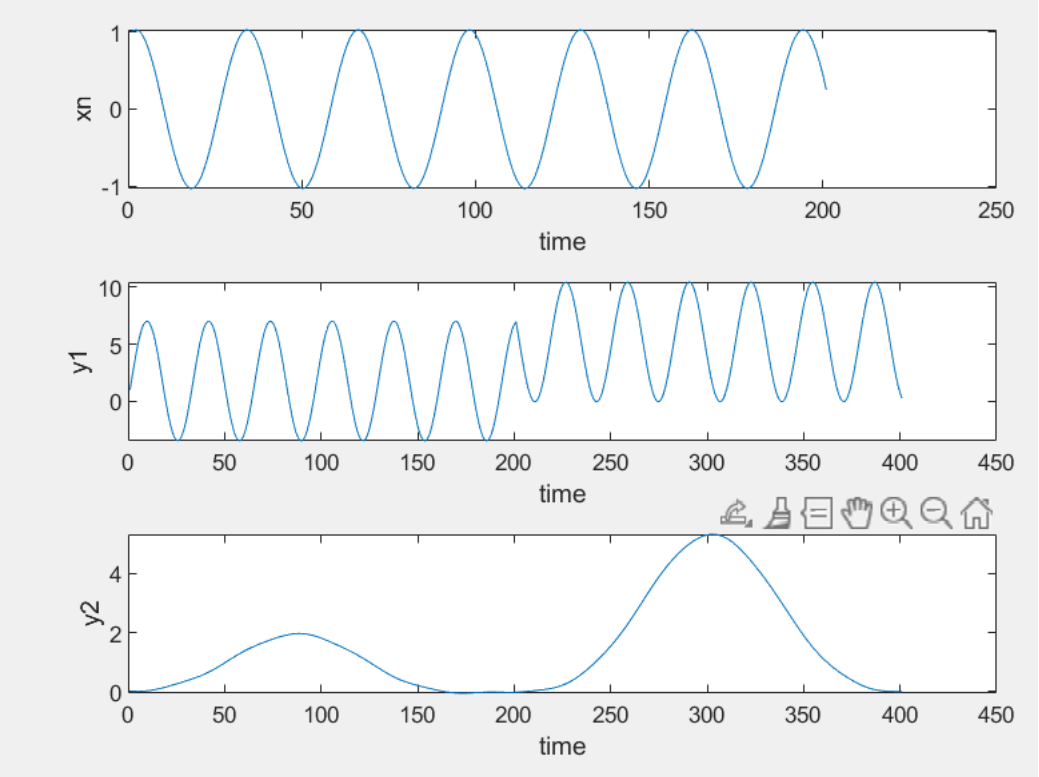
When Blackman window is used:

For the 1001 point:



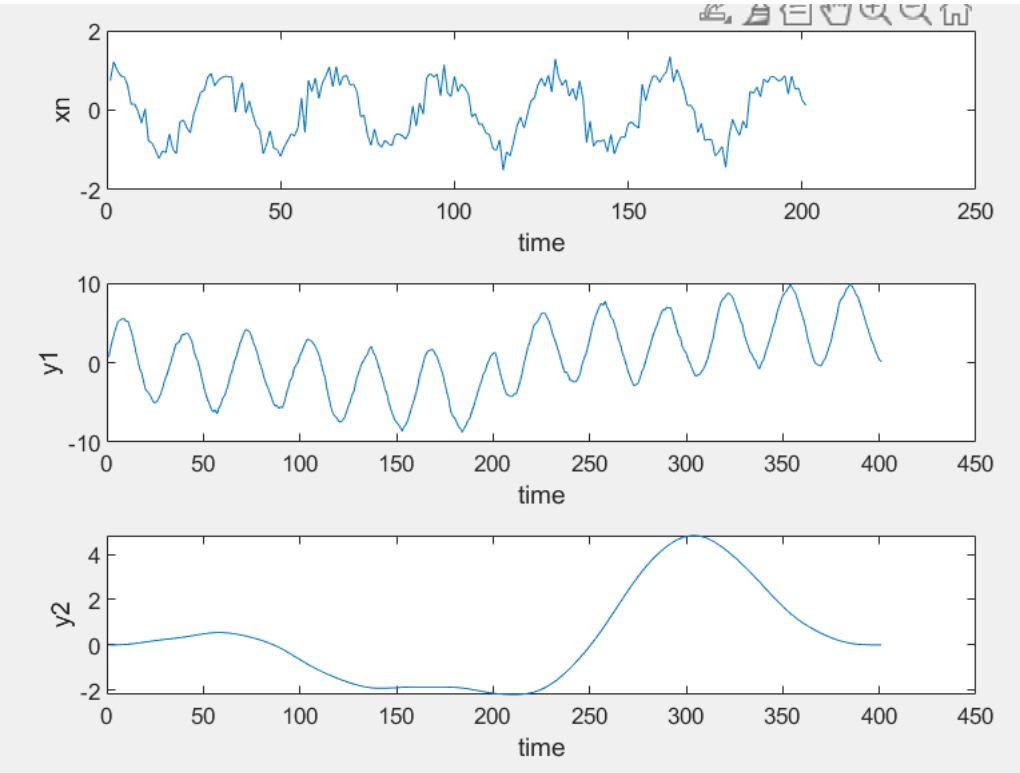
e)when

$$x[n] = \cos\left(\frac{\pi n}{16}\right) + 0.25 \sin\left(\frac{\pi n}{16}\right)$$

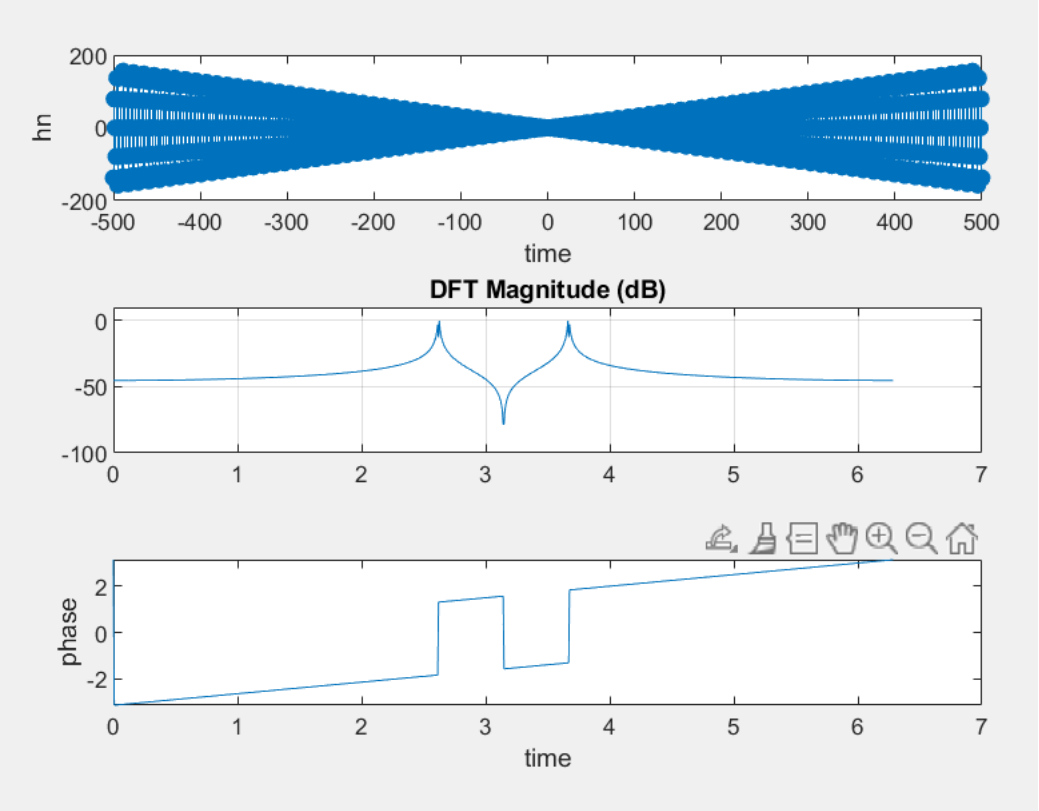


When

$$x_1[n] = \cos\left(\frac{\pi n}{16}\right) + 0.25\, randn(1,201).$$

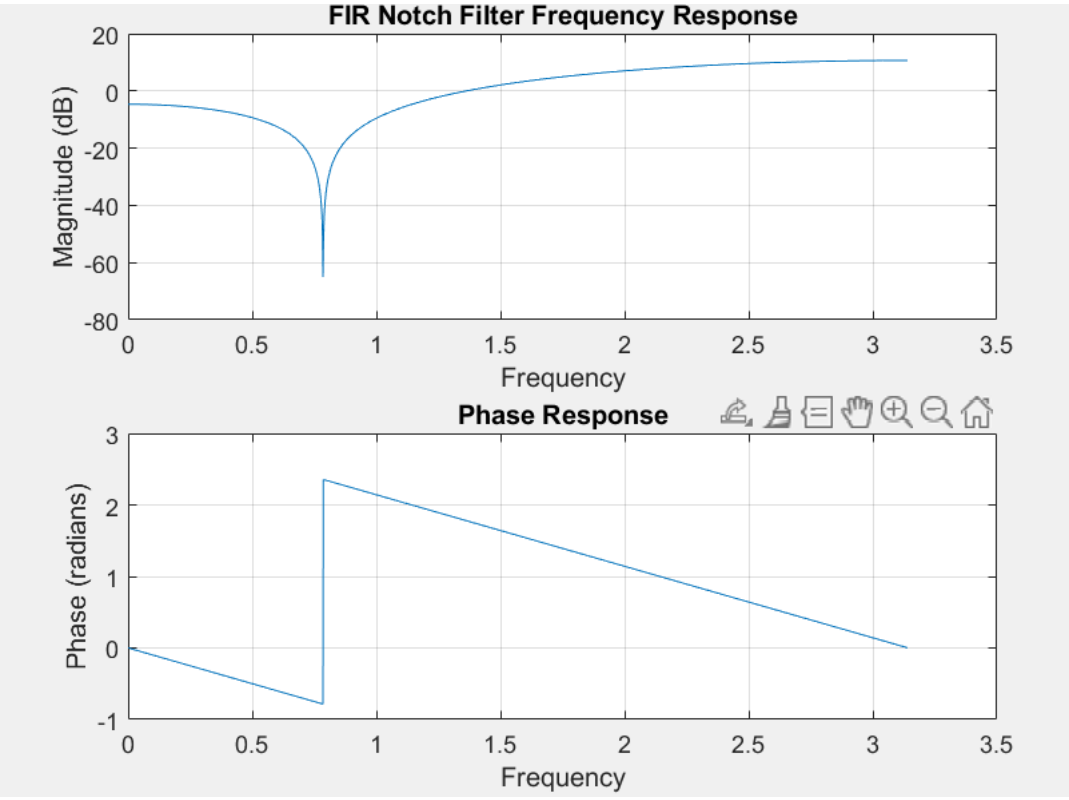


f)

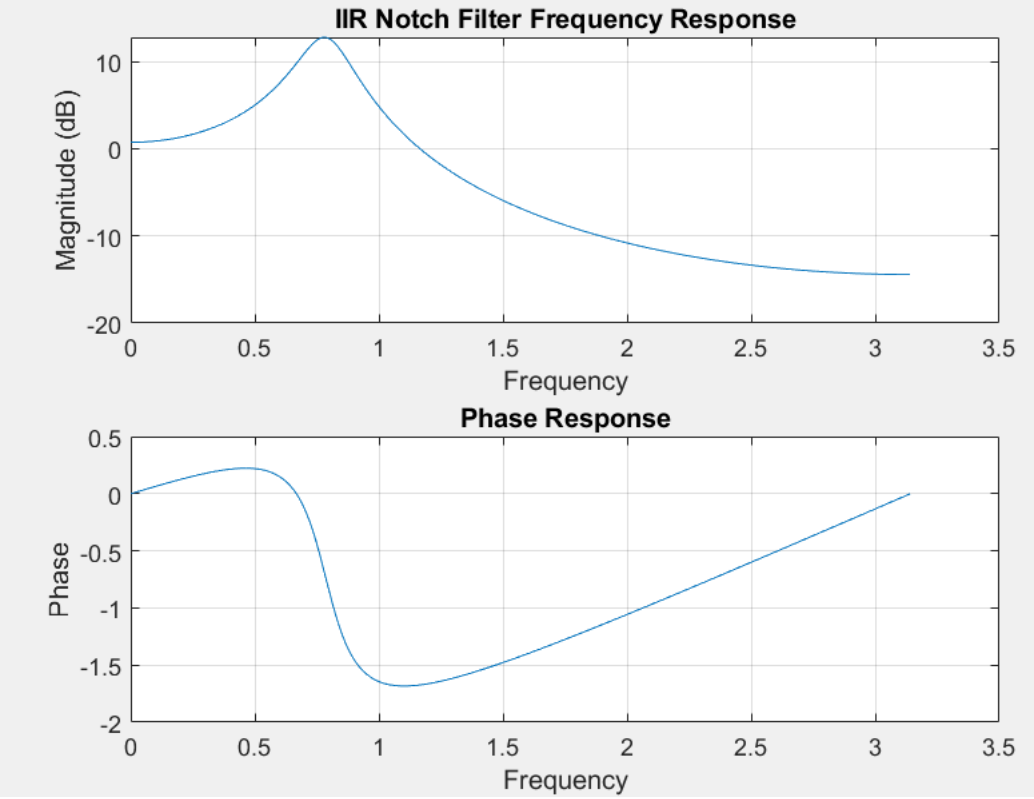

hn
time
DFT Magnitude (dB)
phase
time

3)

a)


FIR Notch Filter Frequency Response
Magnitude (dB)
Frequency
Phase Response
Phase (radians)
Frequency

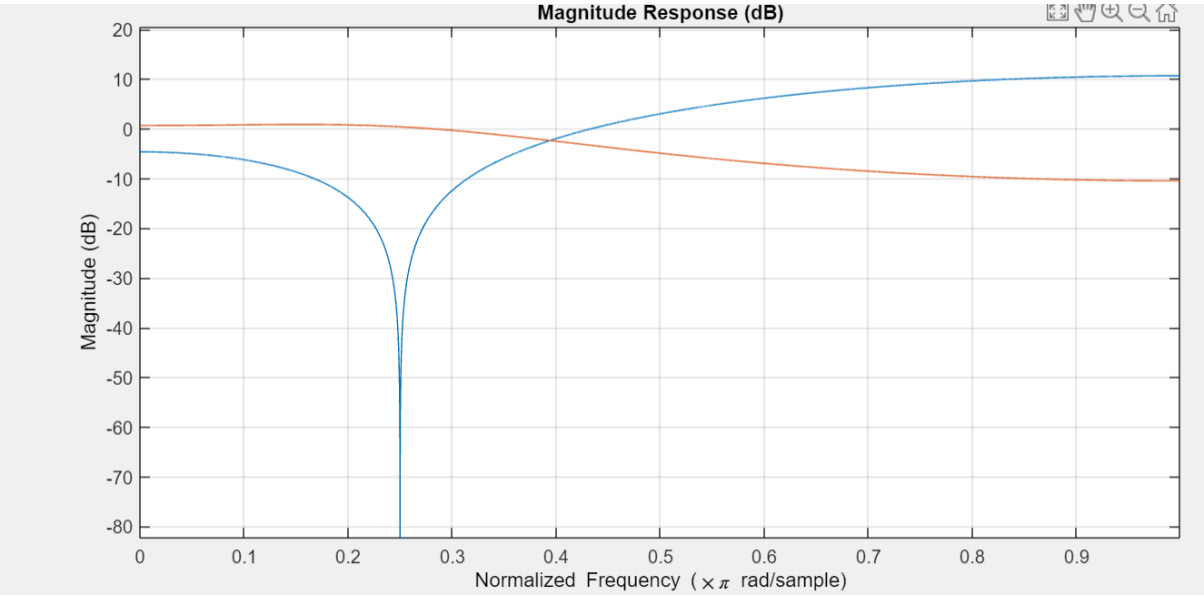
b)



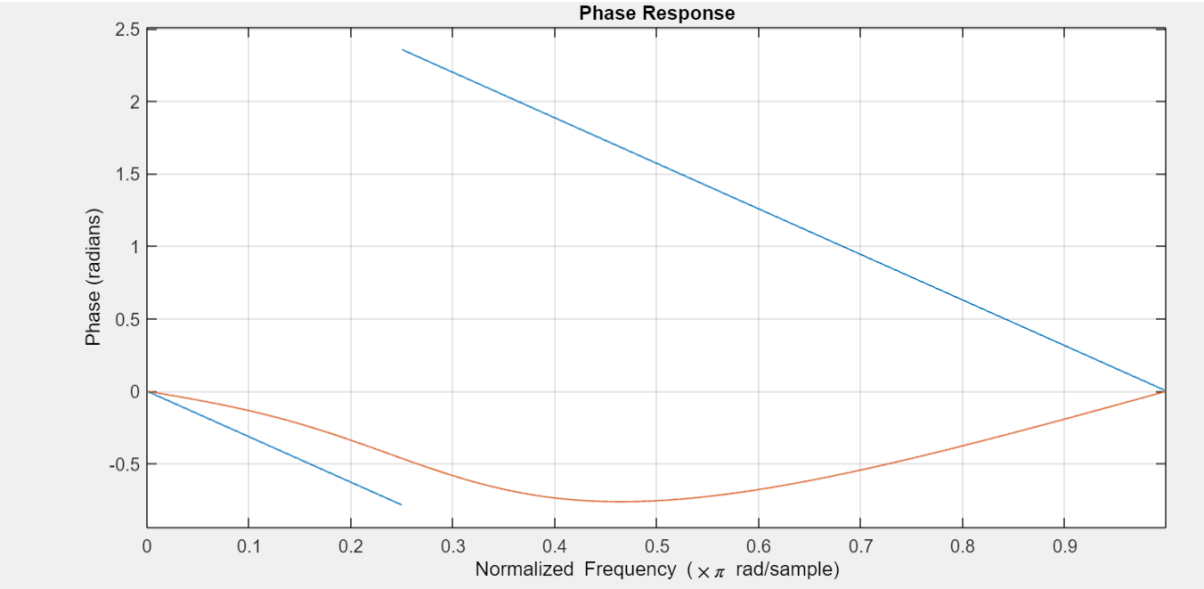
d)

when r=0.5

Magnitude Response:

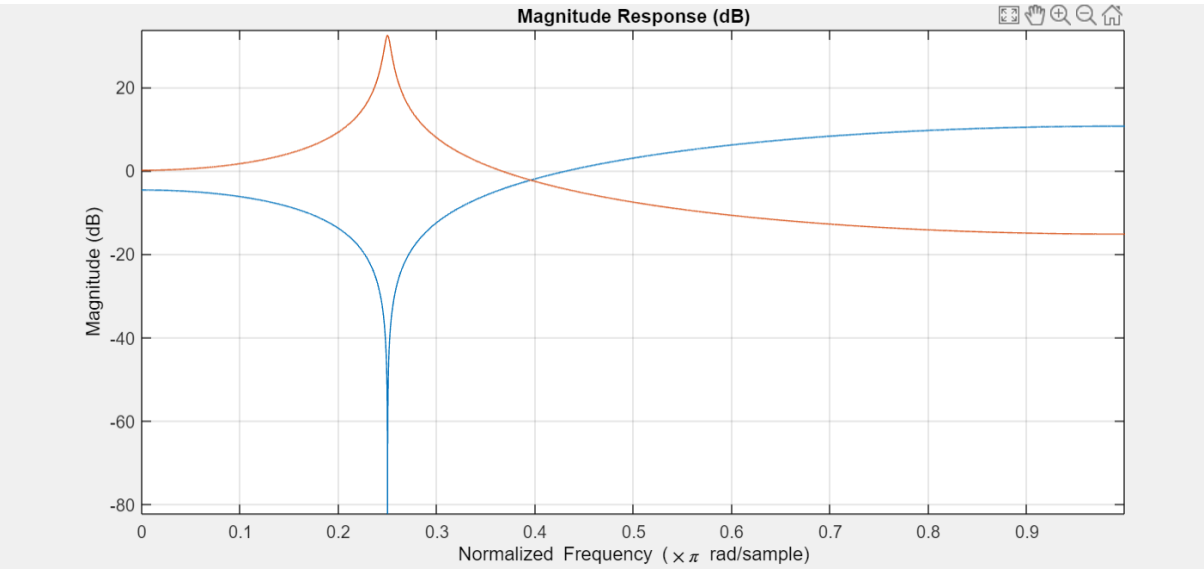


Phase Response:

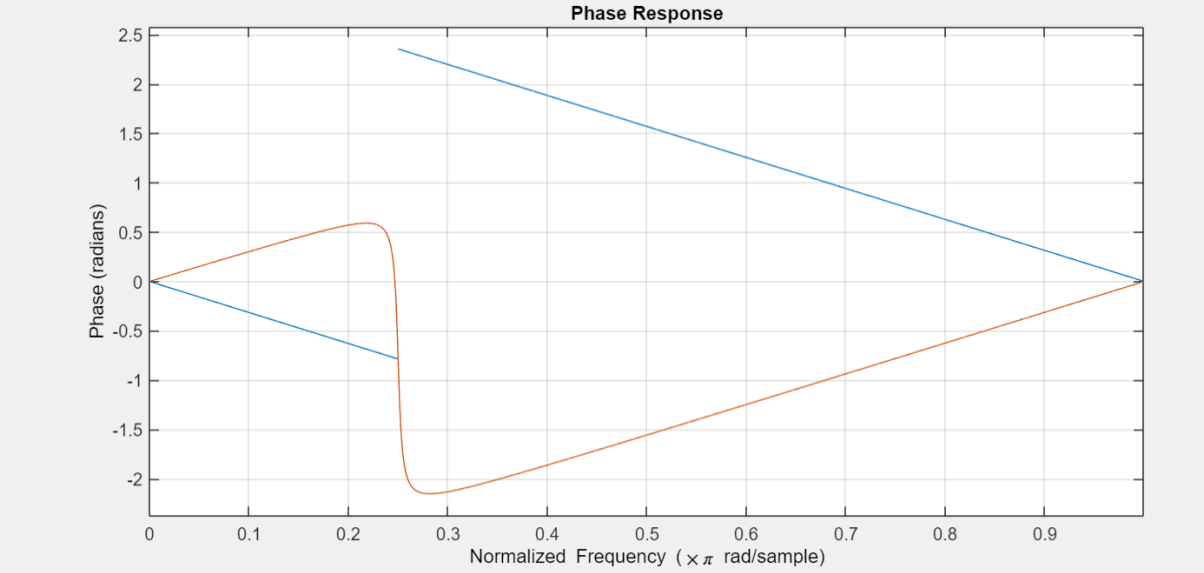


When r=0.99

Magnitude Response:



Phase Response:

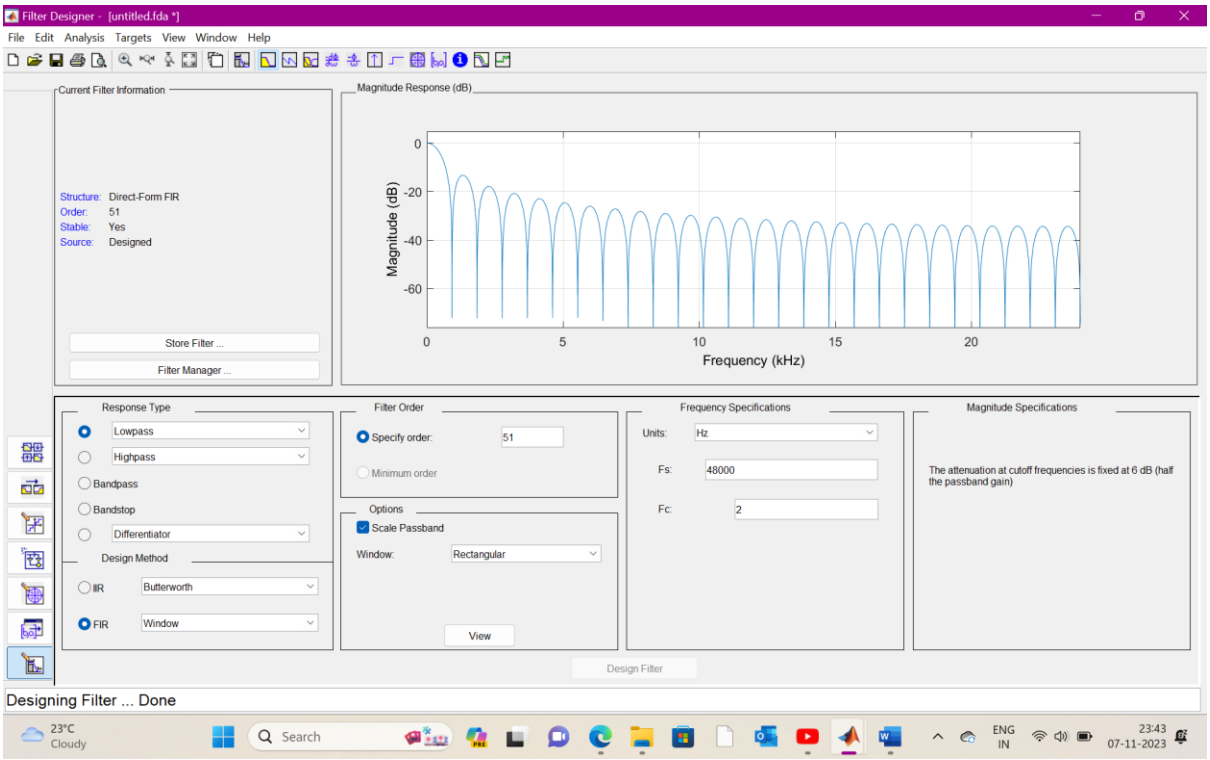


4)

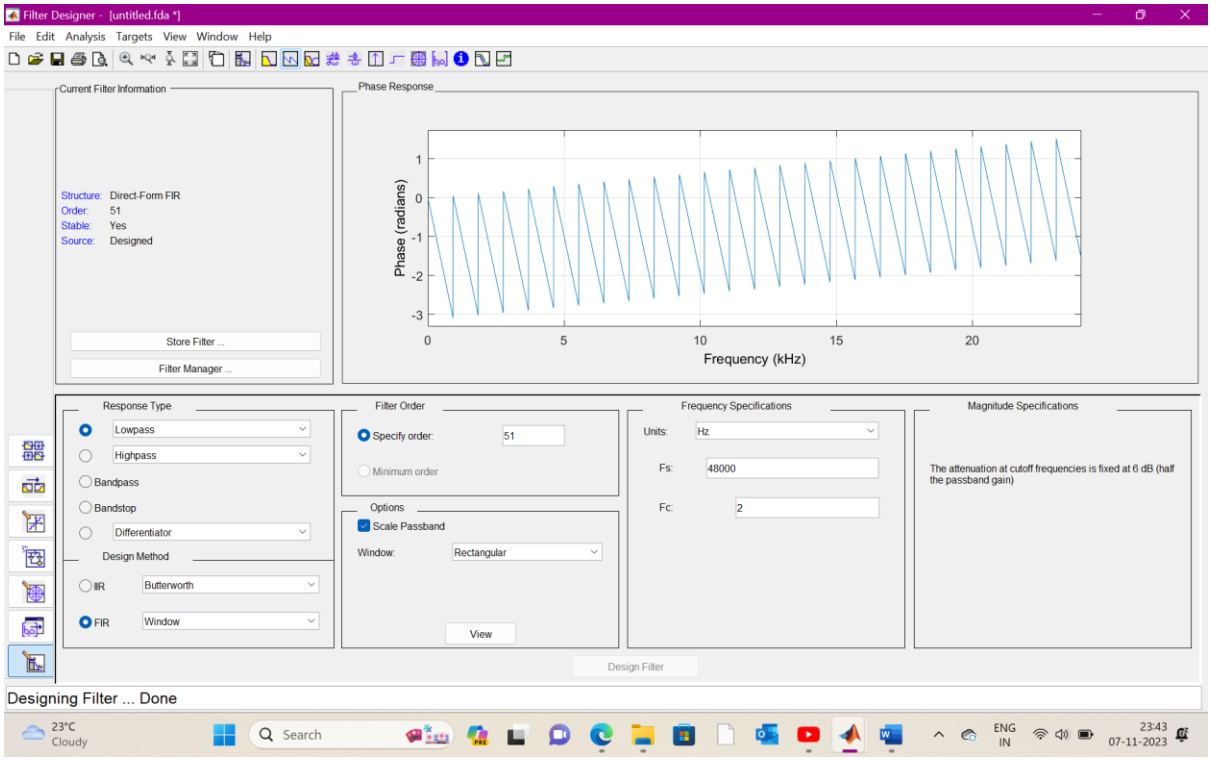
a)

Magnitude Response:

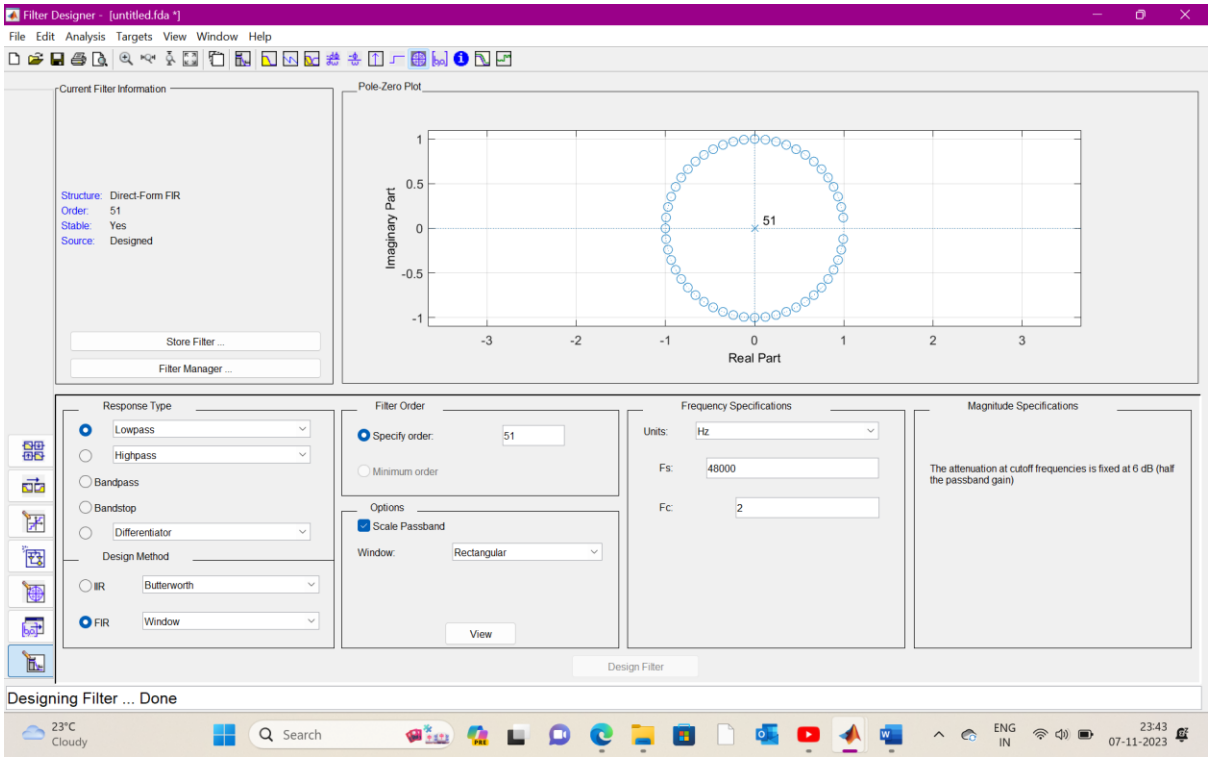
When Fc=2



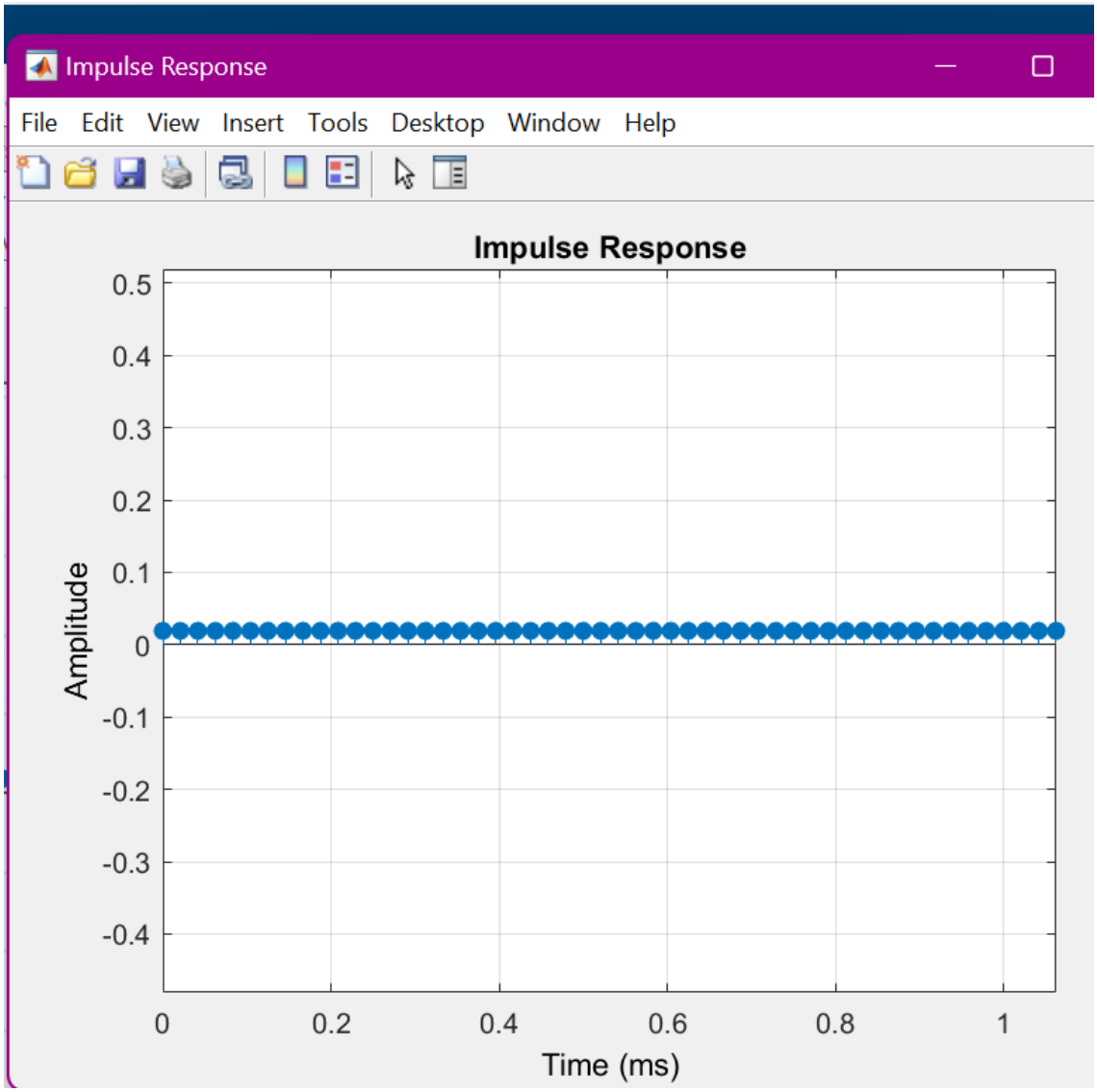
Phase Response:



Pole-zero plot:

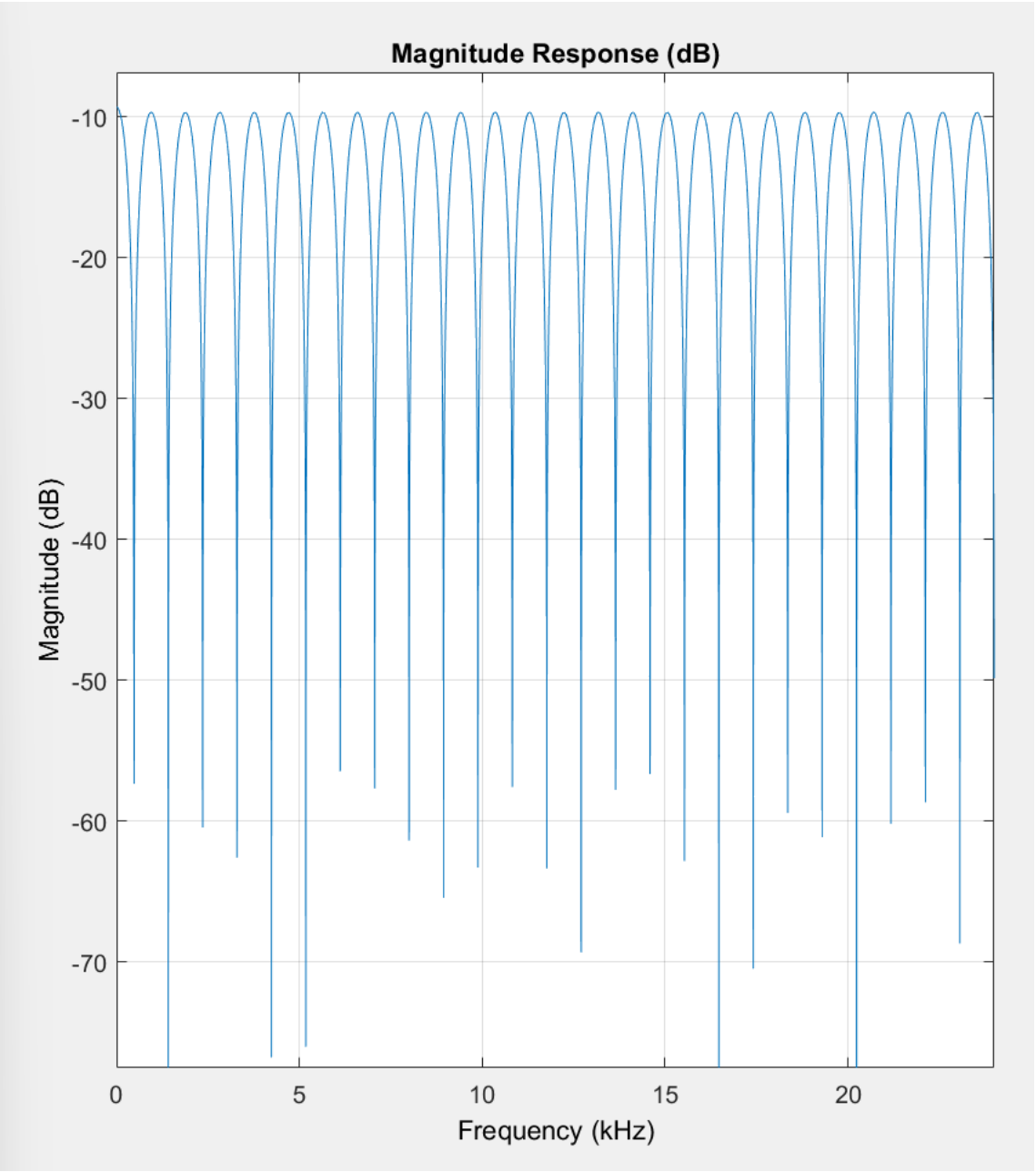


Impulse Response

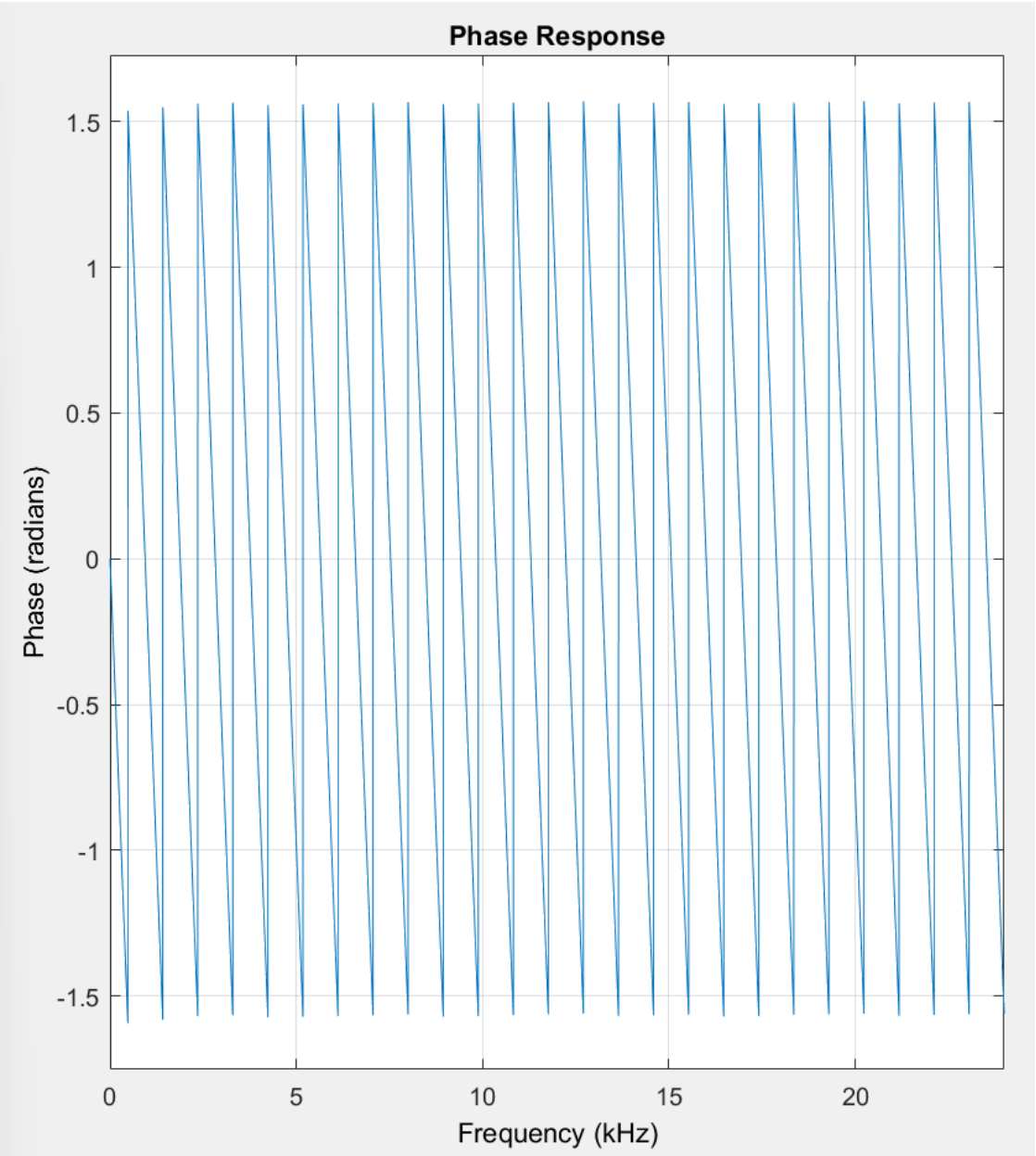


c)

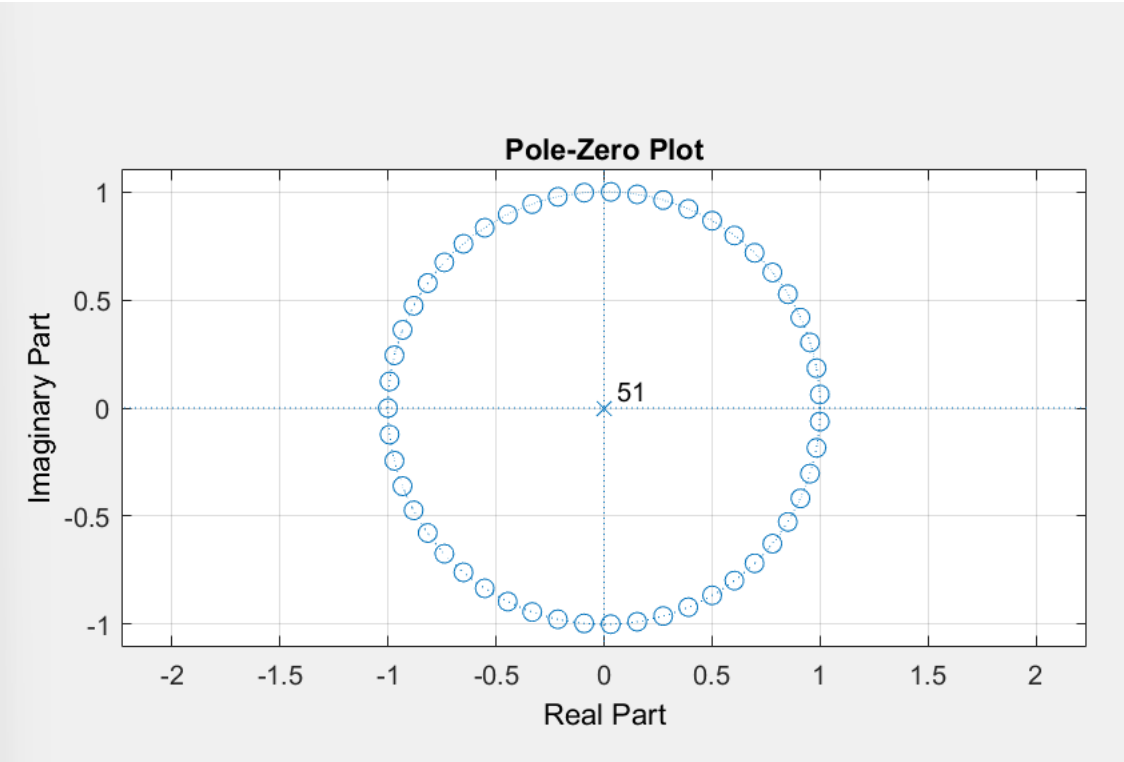
Magnitude Response:



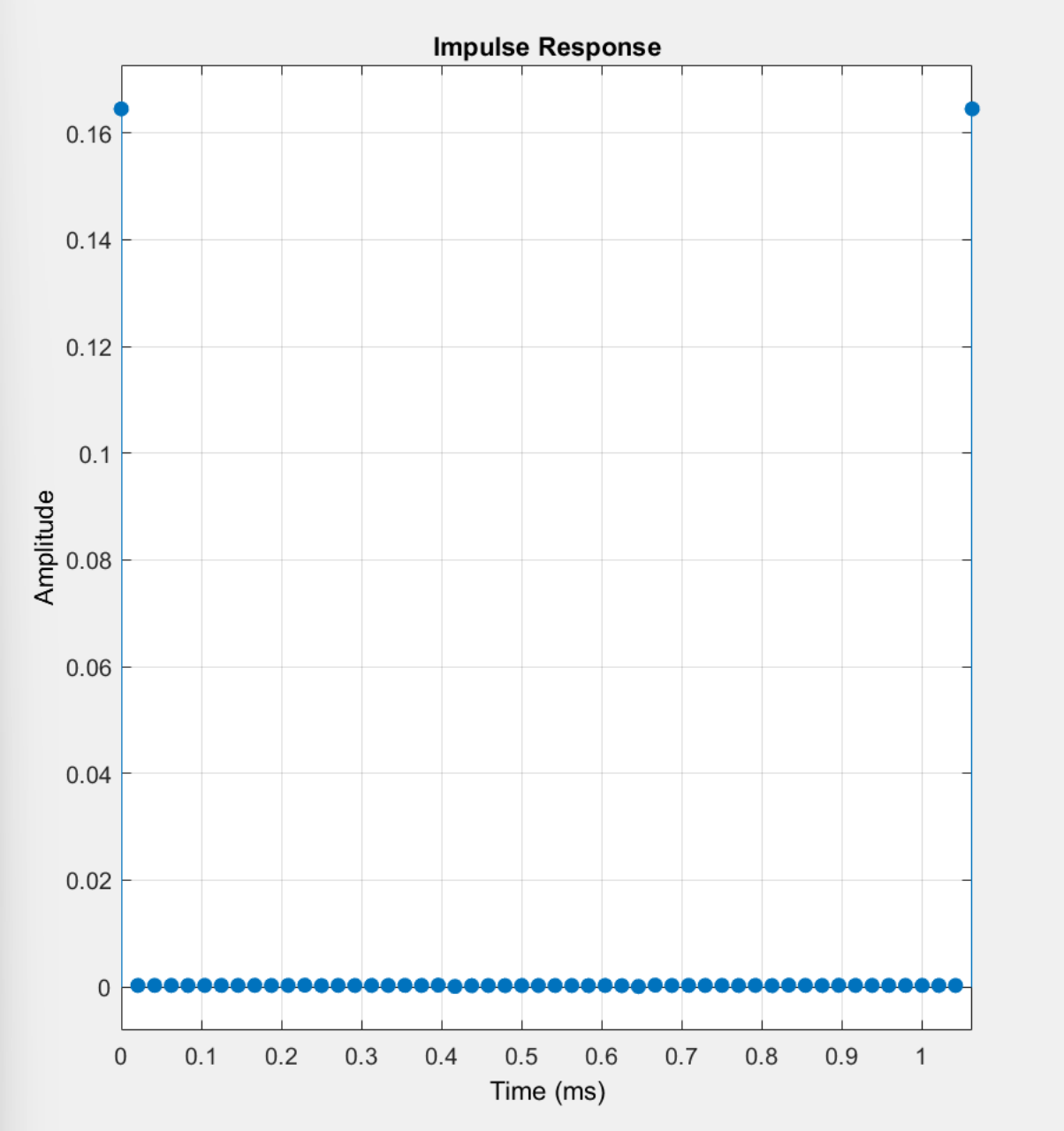
Phase response:



Pole-zero plot:

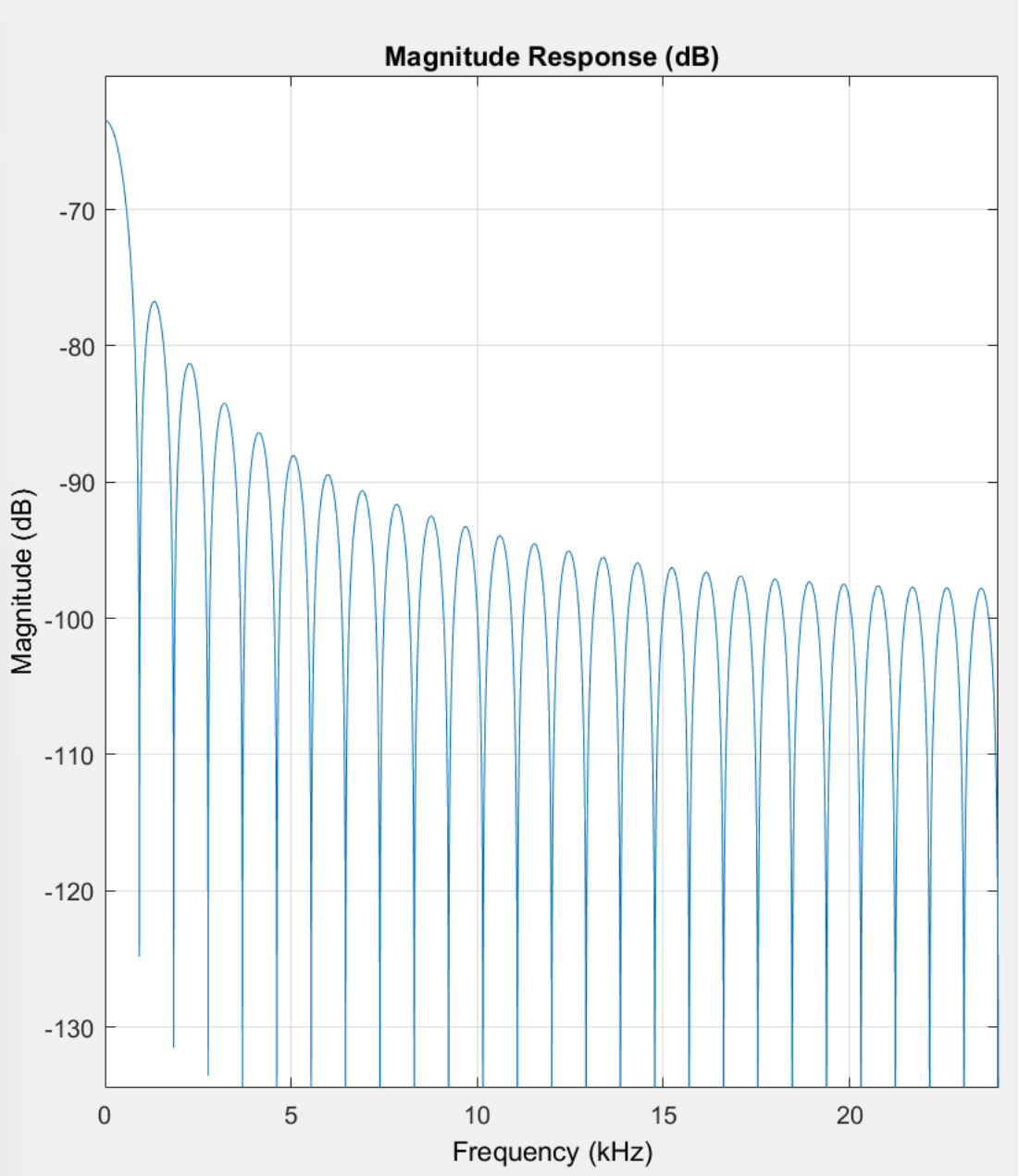


Impulse Response:

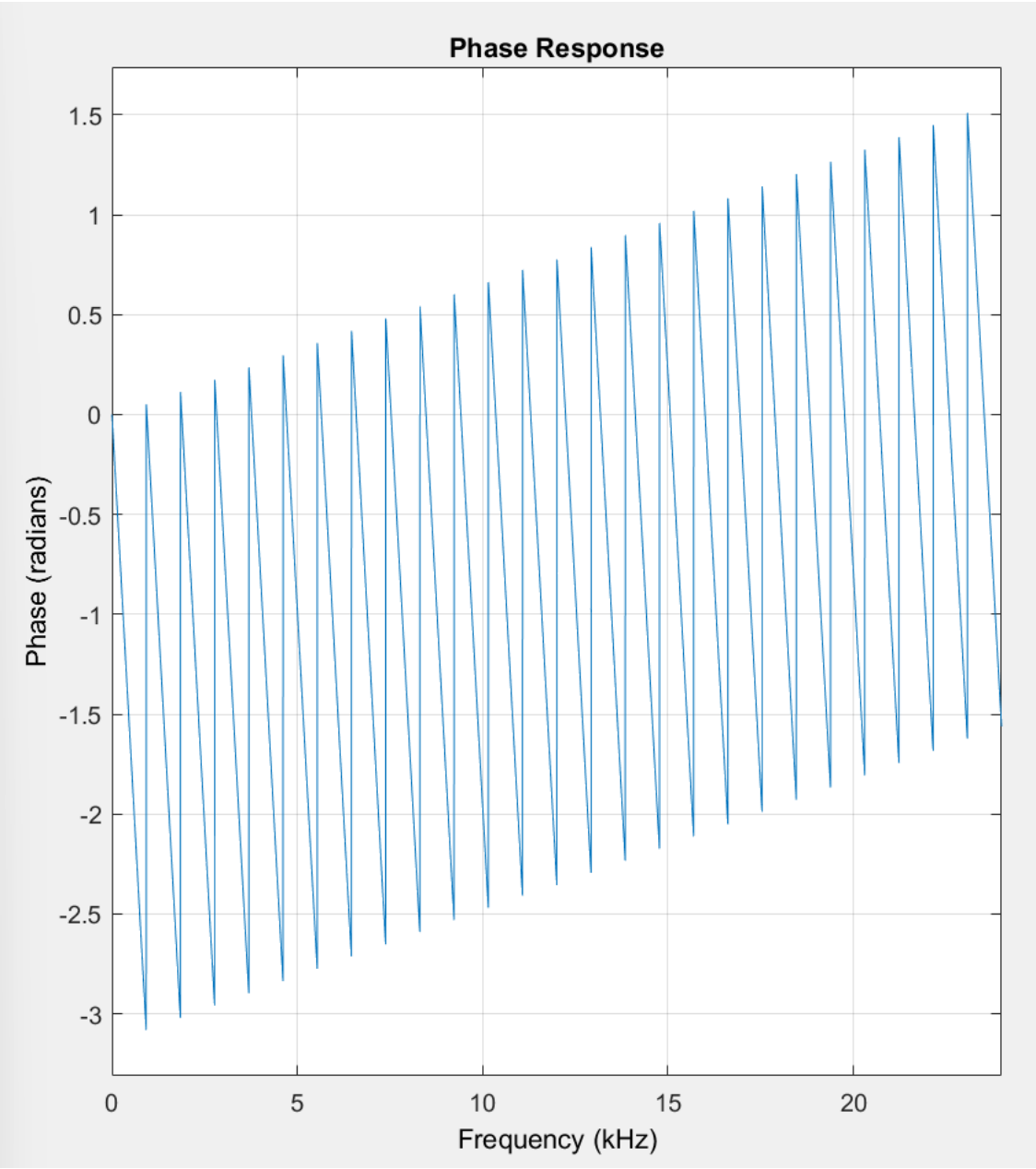


d)

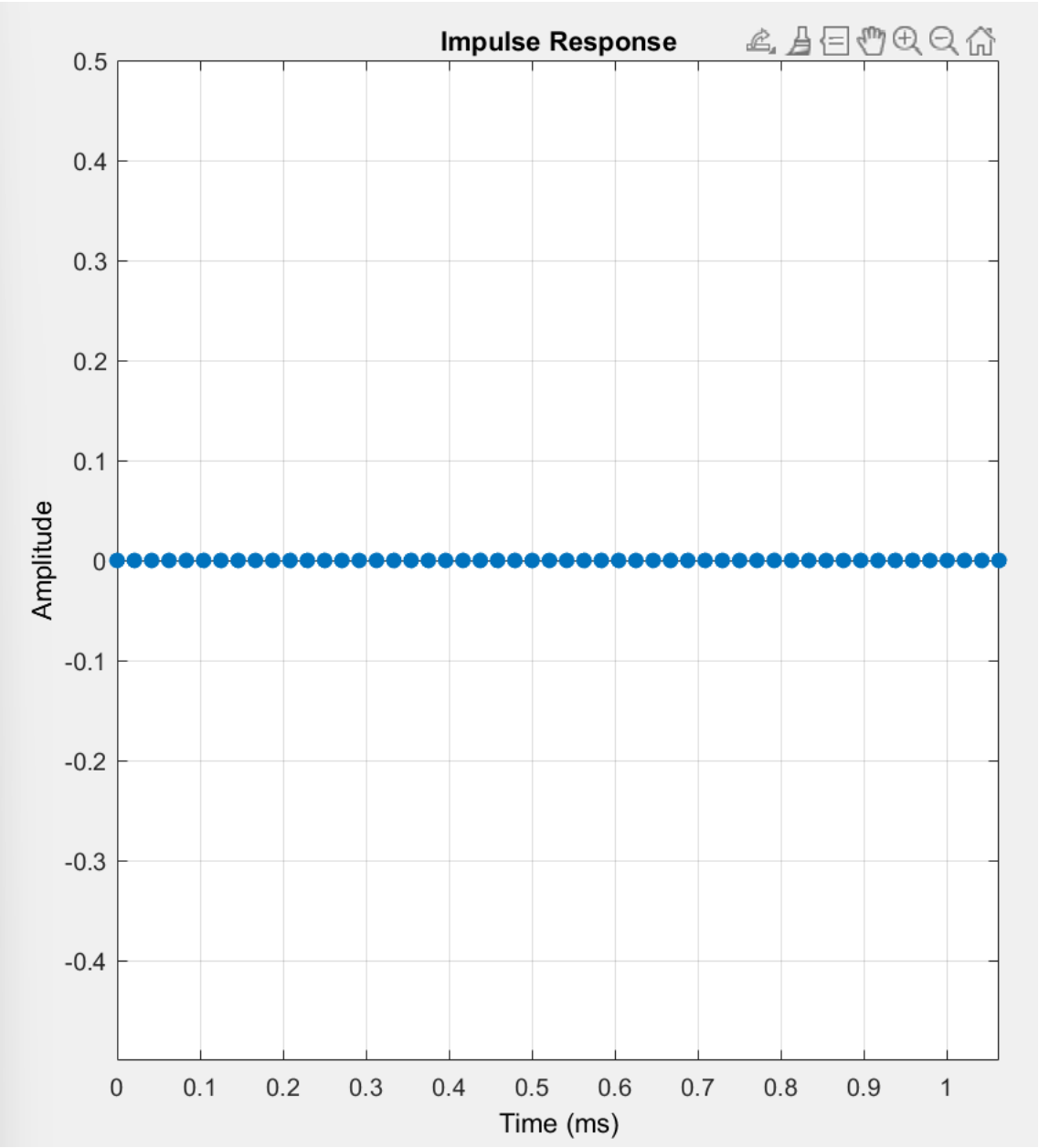
Magnitude Response:



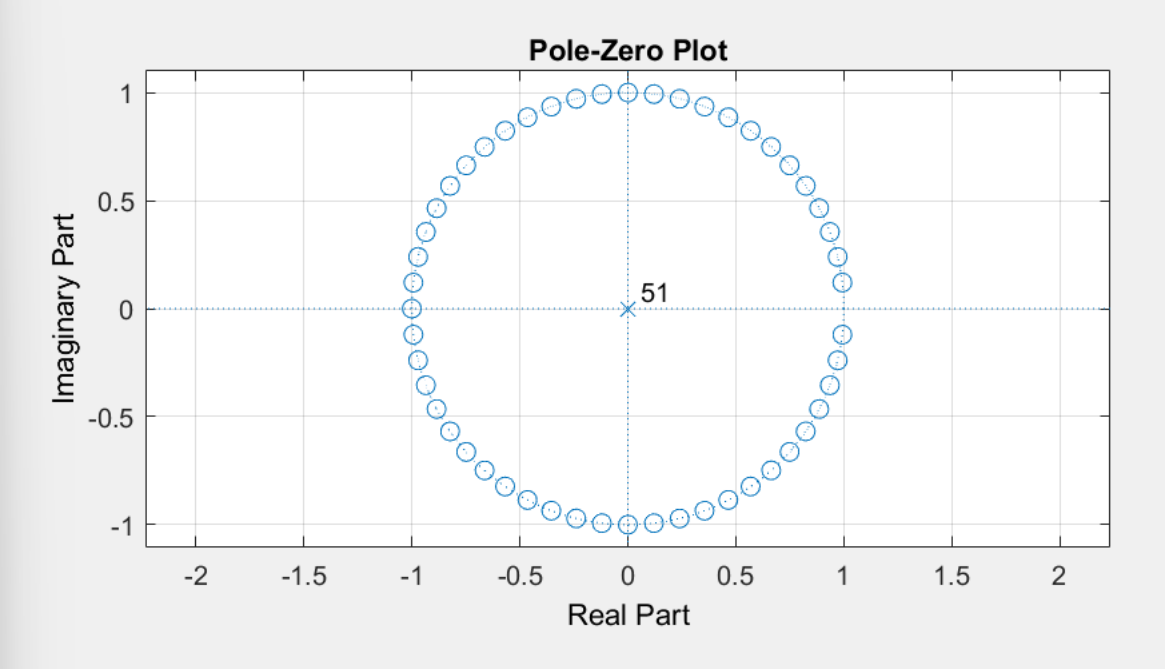
Phase Response:



Impulse Response:



Pole-zero plot:


Pole-Zero Plot
Imaginary Part
Real Part
51
1
0.5
0
-0.5
-1
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2