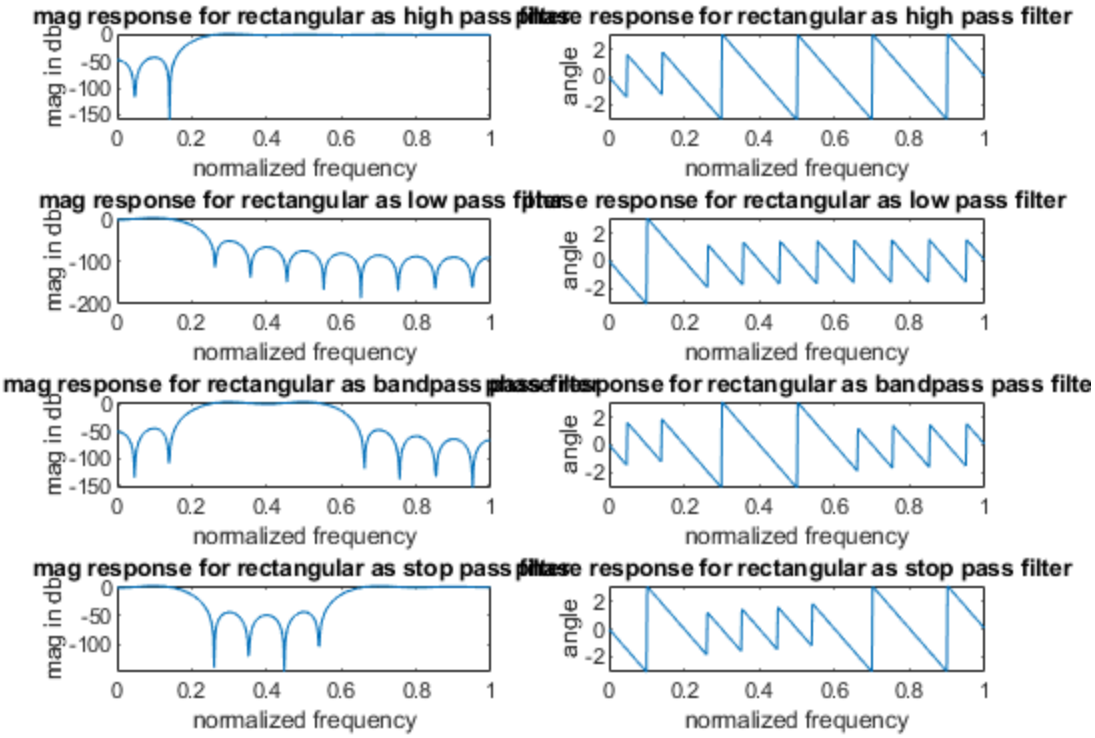
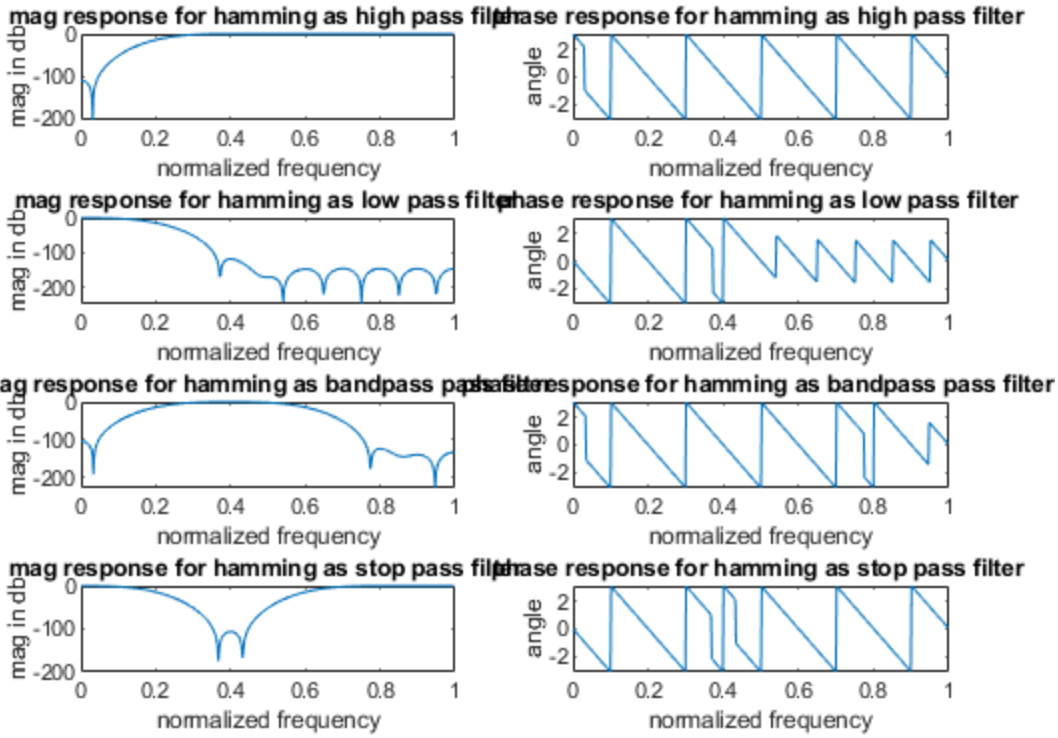
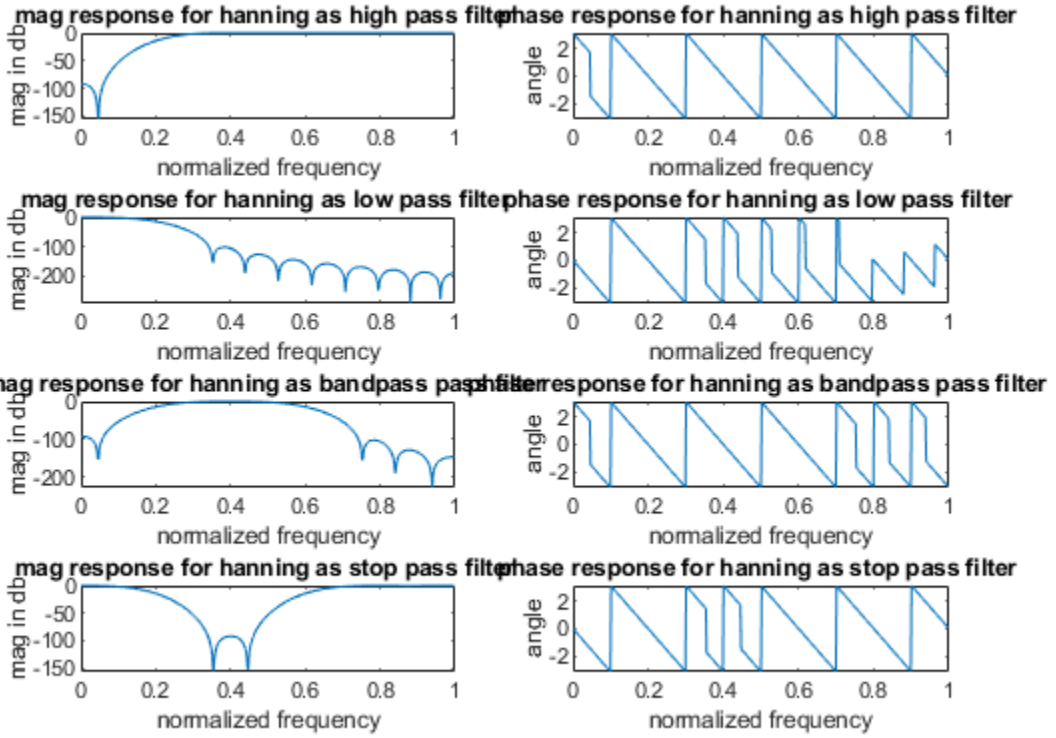
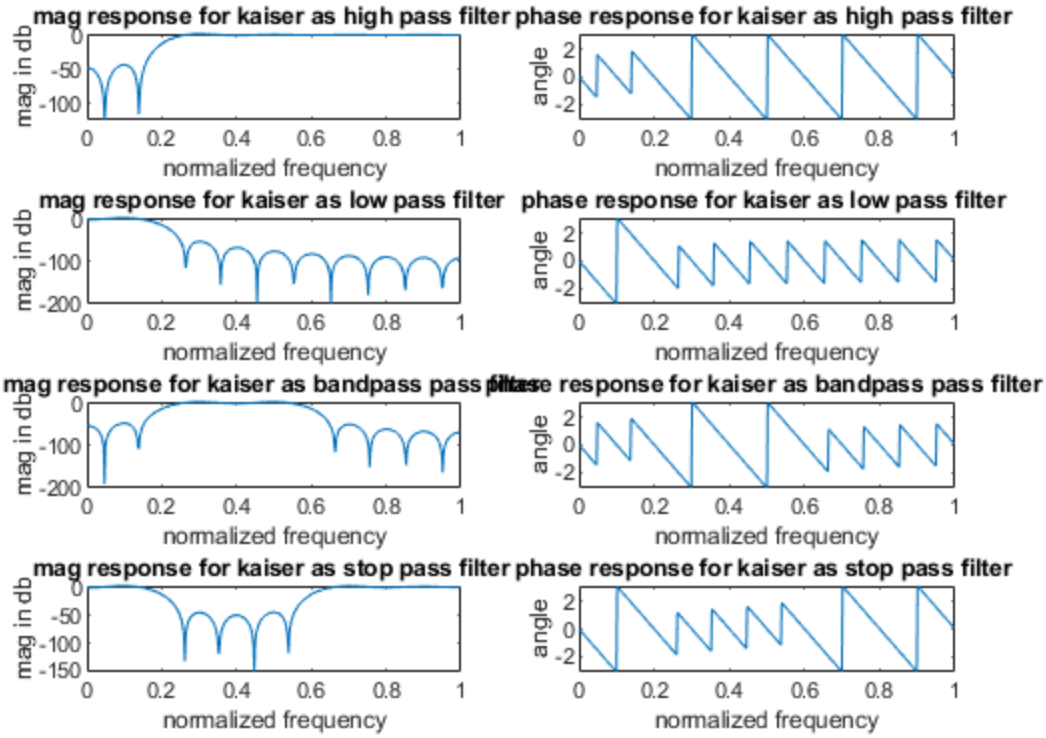
```
clc;%clear console
clear;%clear variables
close all;%close all figures
n = 20;%order of filter
fp = 200;%pass band frequency
fs = 600;%stop band frequency
f = 2000;%sampling frequency
wp = 2*(fp/f);%pass band frequency in rads
ws = 2*(fs/f);%stop band frequency in rads
window_1 = boxcar(n+1);%rectangular window
window_2 = hamming(n+1);%hamming windoe
window_3 = hanning(n+1);%hanning window
window_4 = kaiser(n+1); %kaiser window

%attaching all the doubles to use in loop conveniently
y  = [window_1 ,window_2 ,window_3 ,window_4];

%to be used in titles
name = ["rectangular","hamming","hanning","kaiser"];

%ploting loops
for i = 1:4
    window = y(1:n+1,i);%takes one window at a time
    t = ["high","low","bandpass","stop"];%four different types of
 filter

    for x = 1:length(t)
        if x < 3
            wn = wp;%single frequency for high and low pass filters
        else
            wn = [wp,ws];%two frequencies for band filters
        end

        b = fir1(n,wn,t(x),window);%filter function
        [H,w] = freqz(b,1);%transfer function

        figure (i)%individual figures for each window

        subplot(4,2,2*x-1)
        plot(w/pi,20*log(abs(H)));%magnitude
        xlabel('normalized frequency');
        ylabel('mag in db');
        title ('mag response for ' + name(i) + ' as '+ t(x) +' pass
 filter ');

        subplot(4,2,2*x)
        plot(w/pi,angle(H));%phase
        xlabel('normalized frequency');
        ylabel('angle');
        title ('phase response for ' + name(i) +' as '+ t(x) +' pass
 filter ');
    end
```

```
end
```


mag response for rectangular as high pass filter
mag in db
normalized frequency
phase response for rectangular as high pass filter
angle
normalized frequency
mag response for rectangular as low pass filter
mag in db
normalized frequency
phase response for rectangular as low pass filter
angle
normalized frequency
mag response for rectangular as bandpass pass filter
mag in db
normalized frequency
phase response for rectangular as bandpass pass filte
angle
normalized frequency
mag response for rectangular as stop pass filter
mag in db
normalized frequency
phase response for rectangular as stop pass filter
angle
normalized frequency


mag response for hamming as high pass filter
phase response for hamming as high pass filter
mag response for hamming as low pass filter
phase response for hamming as low pass filter
mag response for hamming as bandpass pass filter
phase response for hamming as bandpass pass filter
mag response for hamming as stop pass filter
phase response for hamming as stop pass filter
mag in db
angle
normalized frequency


mag response for hanning as high pass filter
phase response for hanning as high pass filter
mag response for hanning as low pass filter
phase response for hanning as low pass filter
mag response for hanning as bandpass pass filter
phase response for hanning as bandpass pass filter
mag response for hanning as stop pass filter
phase response for hanning as stop pass filter
mag in db
angle
normalized frequency



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