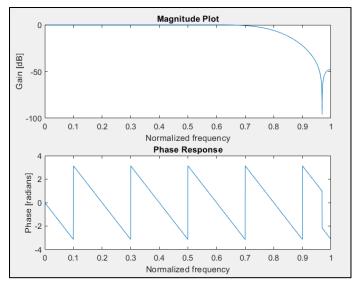
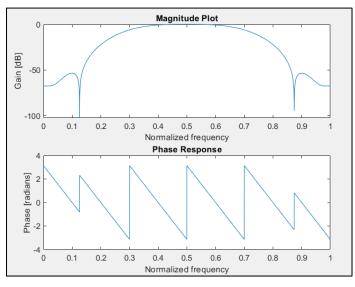
```
% FIR LPF using Hamming Window
                                                    % FIR BPF using Hamming Window
clc;
                                                    clc;
close all;
                                                    close all;
n = 20;
                                                    n = 20;
fp = 400;
                                                    fp = 150;
fs = 1000;
                                                    fq = 350;
fn = 2*fp/fs;
                                                    fs = 1000;
                                                    fp = 2*fp/fs;
window = hamming(n+1);
fr = fir1(n,fn,'low',window);
                                                    fq = 2*fq/fs;
w = 0:0.001:pi;
                                                    fn = [fp fq];
[h,om] = freqz(fr,1,w);
                                                    window = hamming(n+1);
mag = 20*log10(abs(h));
                                                    fr = fir1(n,fn,'bandpass',window);
ph = angle(h);
                                                    w = 0:0.001:pi;
                                                     [h,om] = freqz(fr,1,w);
subplot(2,1,1);
                                                    mag = 20*log10(abs(h));
plot(w/pi,mag);
                                                    ph = angle(h);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
                                                     subplot(2,1,1);
                                                    plot(w/pi,mag);
title('Magnitude Plot');
                                                    xlabel('Normalized frequency');
subplot(2,1,2);
                                                    ylabel('Gain [dB]');
plot(w/pi,ph);
                                                    title('Magnitude Plot');
xlabel('Normalized frequency');
ylabel('Phase [radians]');
                                                     subplot(2,1,2);
title('Phase Response');
                                                    plot(w/pi,ph);
                                                    xlabel('Normalized frequency');
                                                    ylabel('Phase [radians]');
% FIR HPF using Hamming Window
                                                    title('Phase Response');
clc;
close all;
n = 20;
                                                    % FIR BSF using Hamming Window
fp = 100;
                                                    clc;
fs = 1000;
                                                    close all;
fn = 2*fp/fs;
                                                    n = 20;
                                                    fp = 200;
window = hanning(n+1);
fr = fir1(n,fn,'high',window);
                                                    fq = 300;
w = 0:0.001:pi;
                                                    fs = 1000;
[h,om] = freqz(fr,1,w);
                                                    fp = 2*fp/fs;
mag = 20*log10(abs(h));
                                                    fq = 2*fq/fs;
ph = angle(h);
                                                    fn = [fp fq];
                                                    window = hamming(n+1);
subplot(2,1,1);
                                                    fr = fir1(n,fn,'stop',window);
                                                    w = 0:0.001:pi;
plot(w/pi,mag);
xlabel('Normalized frequency');
                                                    [h,om] = freqz(fr,1,w);
                                                    mag = 20*log10(abs(h));
ylabel('Gain [dB]');
title('Magnitude Plot');
                                                    ph = angle(h);
subplot(2,1,2);
                                                     subplot(2,1,1);
plot(w/pi,ph);
                                                    plot(w/pi,mag);
xlabel('Normalized frequency');
                                                    xlabel('Normalized frequency');
ylabel('Phase [radians]');
                                                    ylabel('Gain [dB]');
title('Phase Response');
                                                    title('Magnitude Plot');
                                                     subplot(2,1,2);
                                                     plot(w/pi,ph);
                                                    xlabel('Normalized frequency');
                                                    ylabel('Phase [radians]');
                                                    title('Phase Response');
```



Magnitude Plot Gain [dB] -50 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 Normalized frequency Phase Response Phase [radians] -4 b 0.1 0.2 0.4 0.5 0.9 0.3 0.6 0.7 8.0 Normalized frequency

Fig. i) FIR LPF using Hamming Window

Fig. ii) FIR HPF using Hamming Window



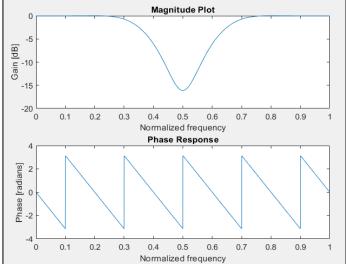
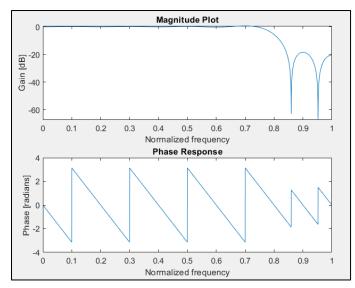


Fig. iii) FIR BPF using Hamming Window

Fig. iv) FIR BSF using Hamming Window

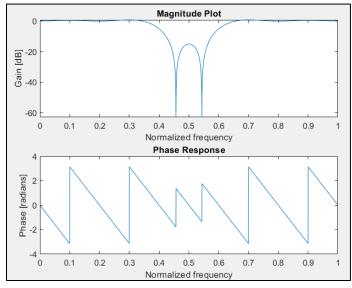
```
% FIR LPF using Rectangular Window
                                                    % FIR BSF using Rectangular Window
clc;
                                                    clc;
close all;
                                                    close all;
n = 20;
                                                    n = 20;
fp = 400;
                                                    fp = 200;
fs = 1000;
                                                    fq = 300;
fn = 2*fp/fs;
                                                    fs = 1000;
                                                    fp = 2*fp/fs;
window = rectwin(n+1);
                                                    fq = 2*fq/fs;
fr = fir1(n,fn,'low',window);
w = 0:0.001:pi;
                                                    fn = [fp fq];
[h,om] = freqz(fr,1,w);
                                                    window = rectwin(n+1);
mag = 20*log10(abs(h));
                                                    fr = fir1(n,fn,'stop',window);
ph = angle(h);
                                                    w = 0:0.001:pi;
                                                    [h,om] = freqz(fr,1,w);
subplot(2,1,1);
                                                    mag = 20*log10(abs(h));
                                                    ph = angle(h);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
                                                     subplot(2,1,1);
                                                    plot(w/pi,mag);
title('Magnitude Plot');
                                                    xlabel('Normalized frequency');
subplot(2,1,2);
                                                    ylabel('Gain [dB]');
plot(w/pi,ph);
                                                    title('Magnitude Plot');
xlabel('Normalized frequency');
ylabel('Phase [radians]');
                                                     subplot(2,1,2);
title('Phase Response');
                                                    plot(w/pi,ph);
                                                    xlabel('Normalized frequency');
% FIR HPF using Rectangular Window
                                                    ylabel('Phase [radians]');
                                                    title('Phase Response');
clc;
close all;
n = 20;
                                                    % FIR BPF using Rectangular Window
fp = 100;
                                                    clc;
fs = 1000;
                                                    close all;
fn = 2*fp/fs;
                                                    n = 20;
                                                    fp = 150;
window = rectwin(n+1);
fr = fir1(n,fn,'high',window);
                                                    fq = 350;
w = 0:0.001:pi;
                                                    fs = 1000;
[h,om] = freqz(fr,1,w);
                                                    fp = 2*fp/fs;
mag = 20*log10(abs(h));
                                                    fq = 2*fq/fs;
ph = angle(h);
                                                    fn = [fp fq];
                                                    window = rectwin(n+1);
                                                    fr = fir1(n,fn,'bandpass',window);
subplot(2,1,1);
                                                    w = 0:0.001:pi;
plot(w/pi,mag);
xlabel('Normalized frequency');
                                                    [h,om] = freqz(fr,1,w);
                                                    mag = 20*log10(abs(h));
ylabel('Gain [dB]');
title('Magnitude Plot');
                                                    ph = angle(h);
subplot(2,1,2);
                                                     subplot(2,1,1);
plot(w/pi,ph);
                                                    plot(w/pi,mag);
xlabel('Normalized frequency');
                                                    xlabel('Normalized frequency');
ylabel('Phase [radians]');
                                                    ylabel('Gain [dB]');
title('Phase Response');
                                                    title('Magnitude Plot');
                                                     subplot(2,1,2);
                                                     plot(w/pi,ph);
                                                    xlabel('Normalized frequency');
                                                    ylabel('Phase [radians]');
                                                    title('Phase Response');
```



Magnitude Plot Gain [dB] -50 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 Normalized frequency Phase Response Phase [radians] 0 -2 -4 t 0.3 0.5 0.9 0.1 0.2 0.4 0.6 0.7 8.0 Normalized frequency

Fig. i) FIR LPF using Rectangular Window

Fig. ii) FIR HPF using Rectangular Window



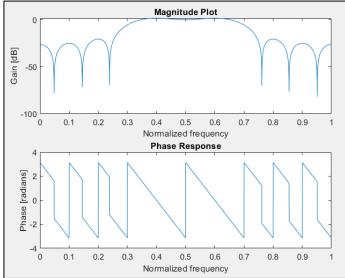


Fig. iii) FIR BPF using Rectangular Window

Fig. iv) FIR BSF using Rectangular Window