```
% FIR LPF using Hamming Window
clc;
close all;
n = 20;
fp = 400;
fs = 1000;
fn = 2*fp/fs;
window = hamming(n+1);
fr = fir1(n,fn,'low',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('NormaIized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

```
% FIR HPF using Hamming Window
clc;
close all;
n = 20;
fp = 100;
fs = 1000;
fn = 2*fp/fs;
window = hanning(n+1);
fr = fir1(n,fn,'high',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('NormaIized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

```
% FIR BPF using Hamming Window
clc;
close all;
n = 20;
fp = 150;
fq = 350;
fs = 1000;
fp = 2*fp/fs;
fq = 2*fq/fs;
fn = [fp fq];
window = hamming(n+1);
fr = fir1(n,fn,'bandpass',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

```
% FIR BSF using Hamming Window
clc;
close all;
n = 20;
fp = 200;
fq = 300;
fs = 1000;
fp = 2*fp/fs;
fq = 2*fq/fs;
fn = [fp fq];
window = hamming(n+1);
fr = fir1(n,fn,'stop',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

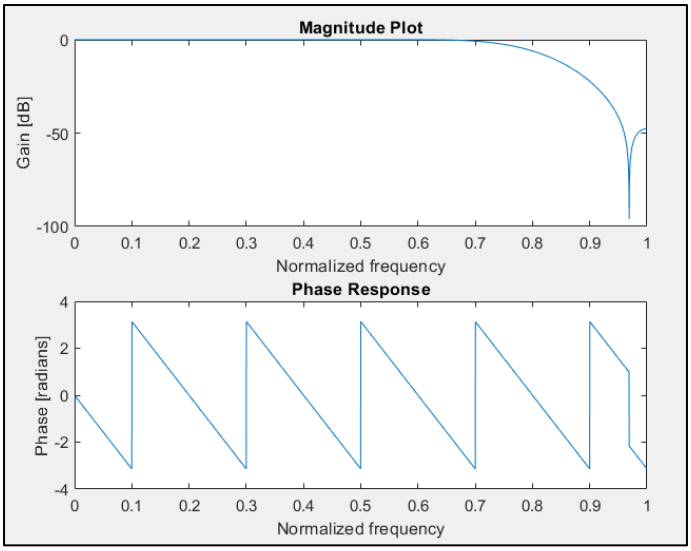

Fig. i) FIR LPF using Hamming Window

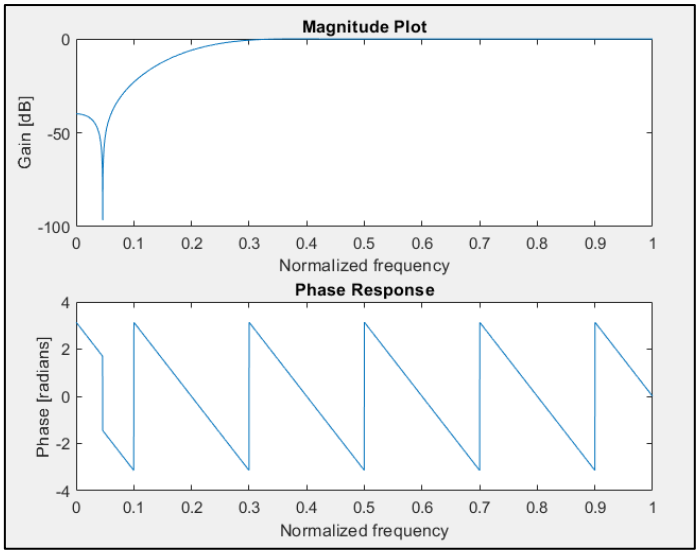

Fig. ii) FIR HPF using Hamming Window

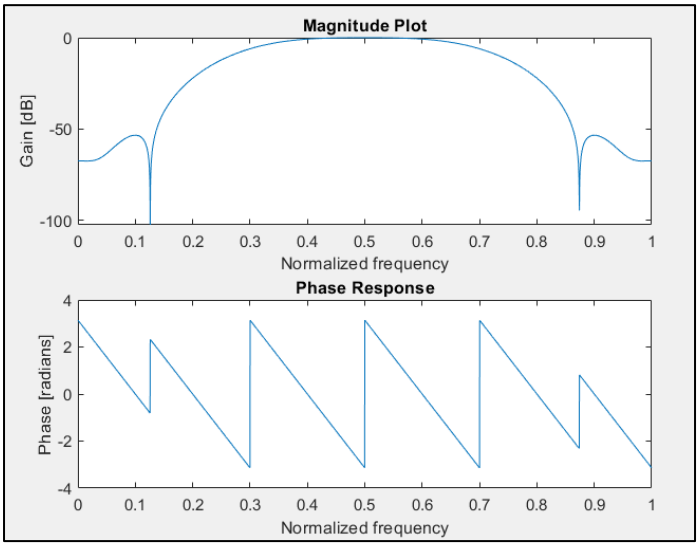

Fig. iii) FIR BPF using Hamming Window

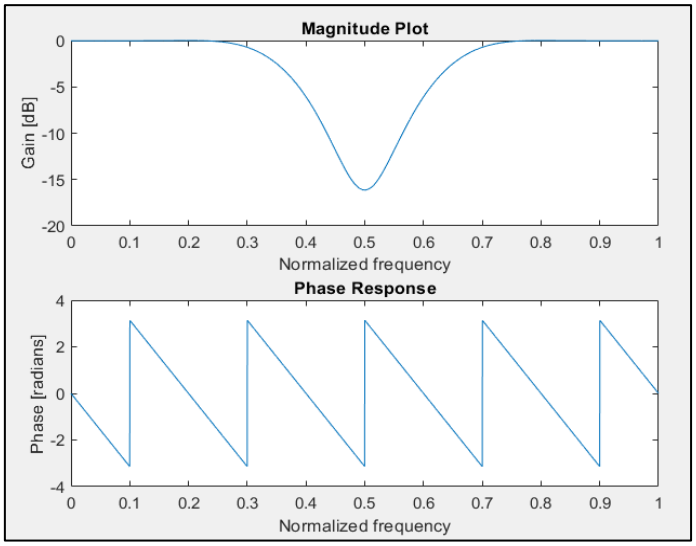

Fig. iv) FIR BSF using Hamming Window

```
% FIR LPF using Rectangular Window
clc;
close all;
n = 20;
fp = 400;
fs = 1000;
fn = 2*fp/fs;
window = rectwin(n+1);
fr = fir1(n,fn,'low',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

```
% FIR HPF using Rectangular Window
clc;
close all;
n = 20;
fp = 100;
fs = 1000;
fn = 2*fp/fs;
window = rectwin(n+1);
fr = fir1(n,fn,'high',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

```
% FIR BSF using Rectangular Window
clc;
close all;
n = 20;
fp = 200;
fq = 300;
fs = 1000;
fp = 2*fp/fs;
fq = 2*fq/fs;
fn = [fp fq];
window = rectwin(n+1);
fr = fir1(n,fn,'stop',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

```
% FIR BPF using Rectangular Window
clc;
close all;
n = 20;
fp = 150;
fq = 350;
fs = 1000;
fp = 2*fp/fs;
fq = 2*fq/fs;
fn = [fp fq];
window = rectwin(n+1);
fr = fir1(n,fn,'bandpass',window);
w = 0:0.001:pi;
[h,om] = freqz(fr,1,w);
mag = 20*log10(abs(h));
ph = angle(h);

subplot(2,1,1);
plot(w/pi,mag);
xlabel('Normalized frequency');
ylabel('Gain [dB]');
title('Magnitude Plot');

subplot(2,1,2);
plot(w/pi,ph);
xlabel('Normalized frequency');
ylabel('Phase [radians]');
title('Phase Response');
```

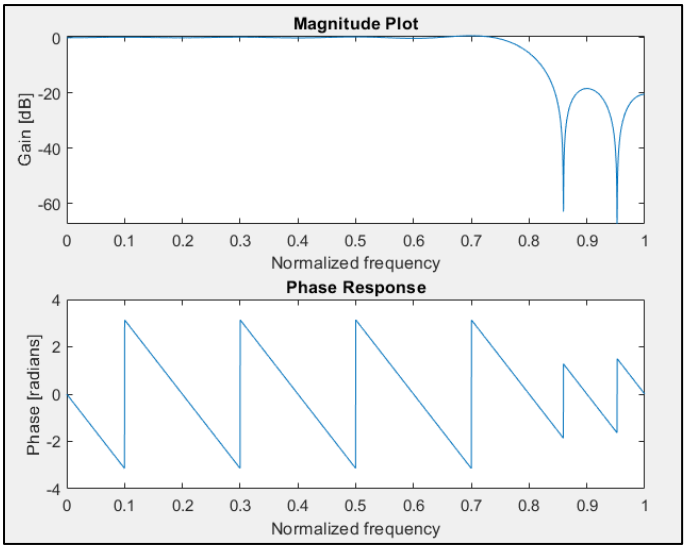

Fig. i) FIR LPF using Rectangular Window

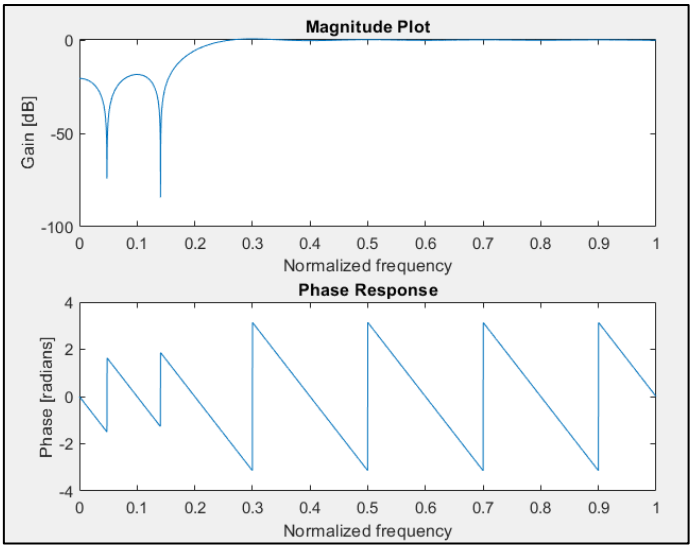

Fig. ii) FIR HPF using Rectangular Window

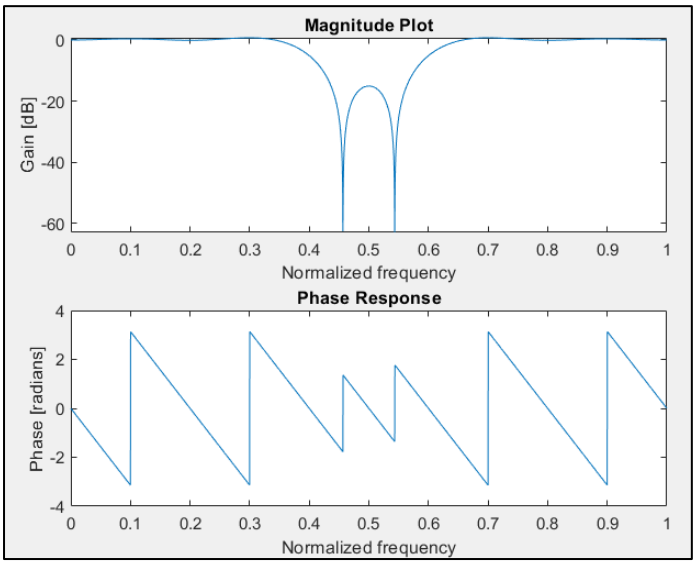

Fig. iii) FIR BPF using Rectangular Window

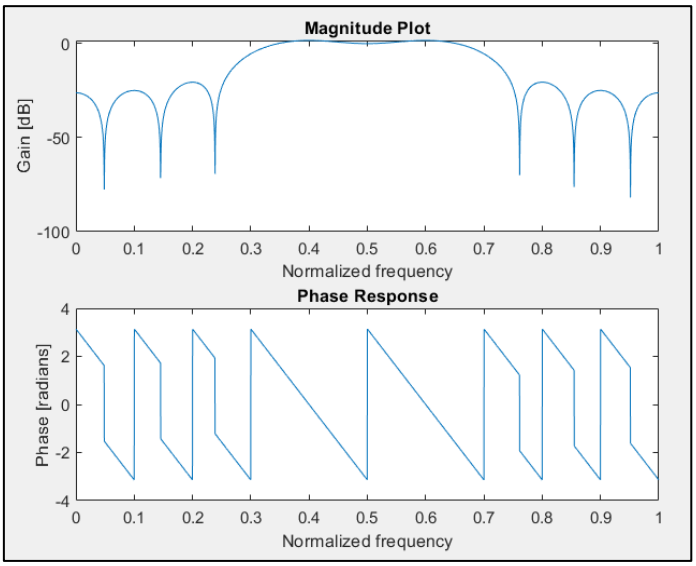

Fig. iv) FIR BSF using Rectangular Window