```
% Butterworth Low Pass Filter
                                                     % Butterworth Band Stop Filter
clc;
                                                     clc;
close all;
                                                     close all;
                                                     ws = [0.4 \ 0.6];
alphas = 30;
alphap = 0.5;
                                                     wp = [0.3 \ 0.7];
fpass=1000;
                                                     alphap = 0.4;
fstop=1500;
                                                     alphas = 50;
fsam=5000;
                                                     [n,wn] = buttord(wp,ws,alphap,alphas);
                                                     [b,a] = butter(n,wn,'stop');
wp=2 *fpass/fsam;
ws=2*fstop/fsam;
                                                     [h,w] = freqz(b,a);
[n,wn] = buttord(wp,ws,alphap,alphas);
[b,a] = butter(n,wn);
                                                     subplot(2,1,1);
                                                     plot(w/pi,20*log10(abs(h)));
[h,w] = freqz(b,a);
                                                     xlabel('Normalized Frequency');
subplot(2,1,1);
                                                     vlabel('Gain [db]');
plot(w/pi,20*log10(abs(h)));
                                                     title('Magnitude response');
xlabel('Normalized Frequency');
ylabel('Gain [db]');
                                                     subplot(2,1,2);
                                                     plot(w/pi,angle(h));
title('Magnitude response');
                                                     xlabel('Normalized Frequency');
                                                     ylabel('Phase [radians]');
subplot(2,1,2);
plot(w/pi,angle(h));
                                                     title('Phase response');
xlabel('Normalized Frequency');
ylabel('Phase [radians]');
                                                     % Butterworth Band Pass Filter
title('Phase response');
                                                     clc;
                                                     close all;
% Butterworth High Pass Filter
                                                     ws = [0.3 \ 0.7];
                                                     wp = [0.4 \ 0.6];
clc;
close all;
                                                     alphap = 0.4;
alphas = 50;
                                                     alphas = 50;
                                                     [n, wn] = buttord(wp, ws, alphap, alphas);
alphap= 1;
fp=1050;
                                                     [b, a] = butter(n, wn, 'bandpass');
fs=600;
                                                     [h, w] = freqz(b, a);
fsam=3500;
wp=2*fp/fsam;
                                                     subplot(2,1,1);
                                                     plot(w/pi, 20*log10(abs(h)));
ws=2 *fs/fsam;
[n,wn] = buttord(wp,ws,alphap,alphas);
                                                     xlabel('Normalized Frequency');
[b,a] = butter(n,wn,'high');
                                                     ylabel('Gain [dB]');
[h,w] = freqz(b,a);
                                                     title('Magnitude Response - Bandpass
                                                     Filter');
subplot(2,1,1);
plot(w/pi,20*log10(abs(h)));
                                                     subplot(2,1,2);
xlabel('Normalized Frequency');
                                                     plot(w/pi, angle(h));
ylabel('Gain [db]');
                                                     xlabel('Normalized Frequency');
                                                     ylabel('Phase [radians]');
title('Magnitude response');
                                                     title('Phase Response - Bandpass Filter');
subplot(2,1,2);
plot(w/pi,angle(h));
xlabel('Normalized Frequency');
ylabel('Phase [radians]');
title('Phase response');
```

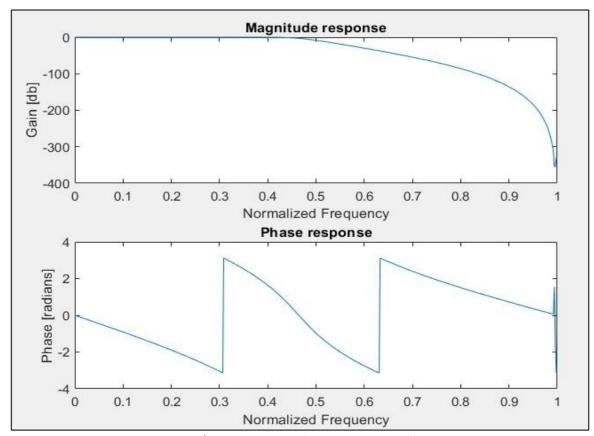


Fig. i) Butterworth Low Pass Filter

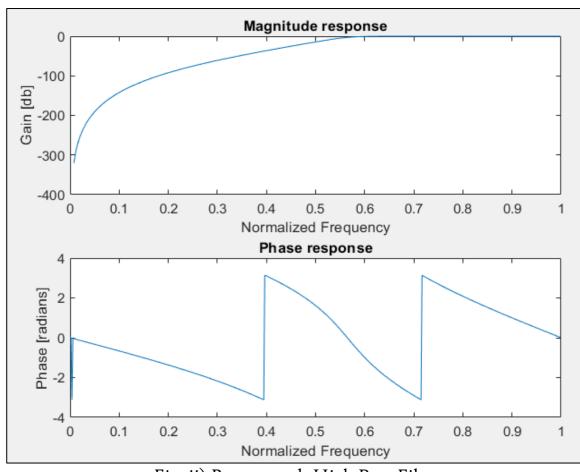


Fig. ii) Butterworth High Pass Filter

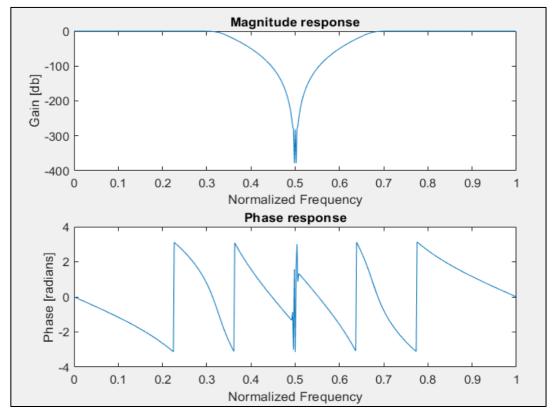


Fig. iii) Butterworth Band Stop Filter

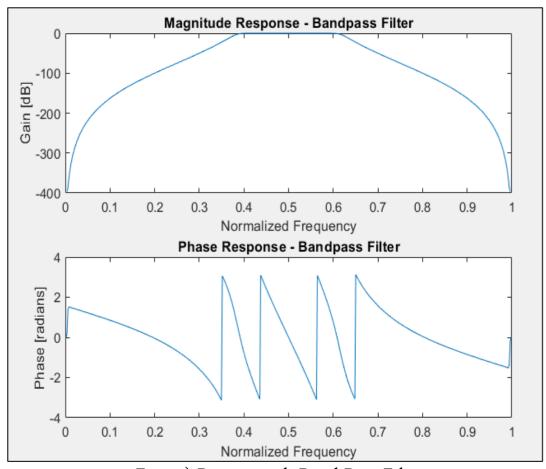


Fig. iv) Butterworth Band Pass Filter