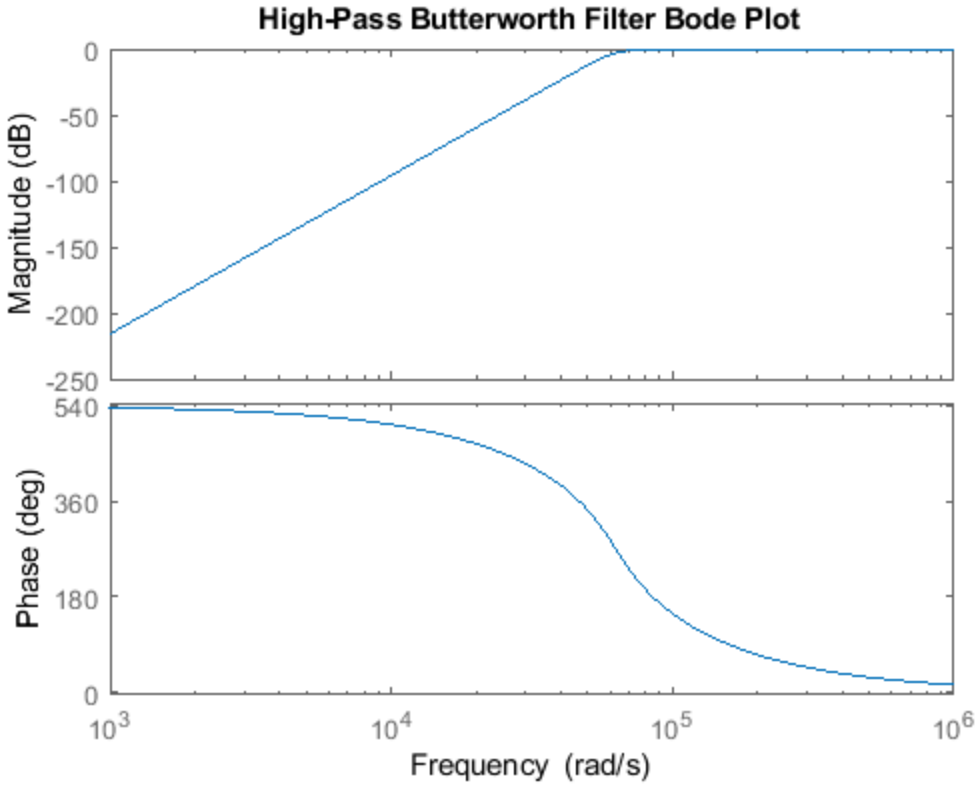
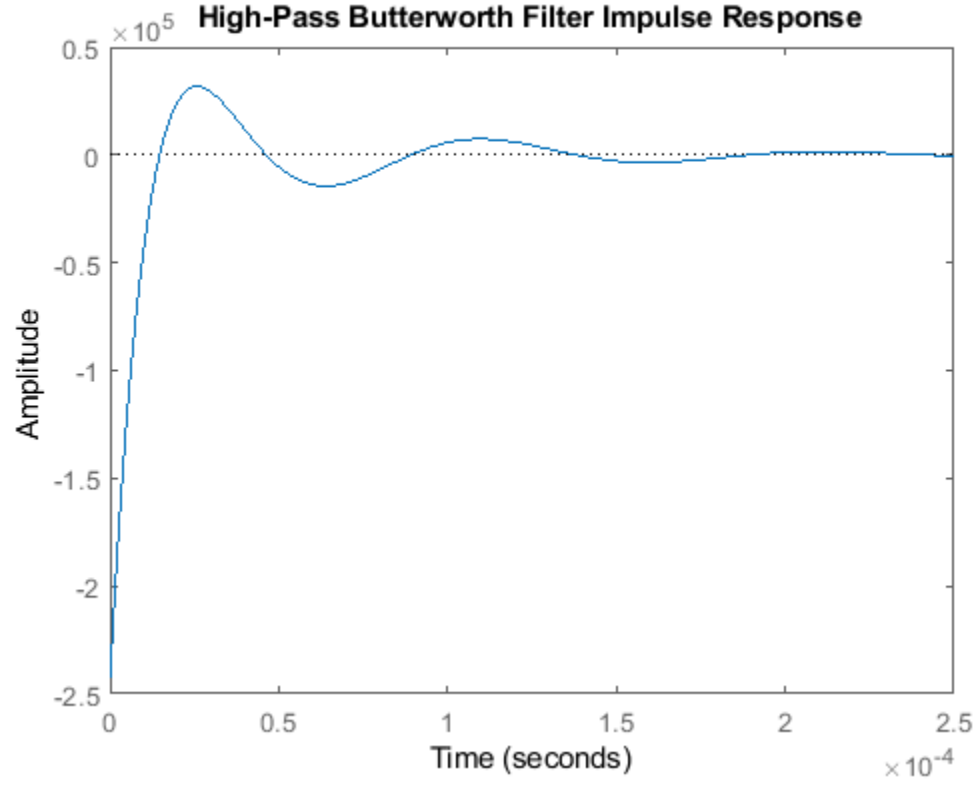
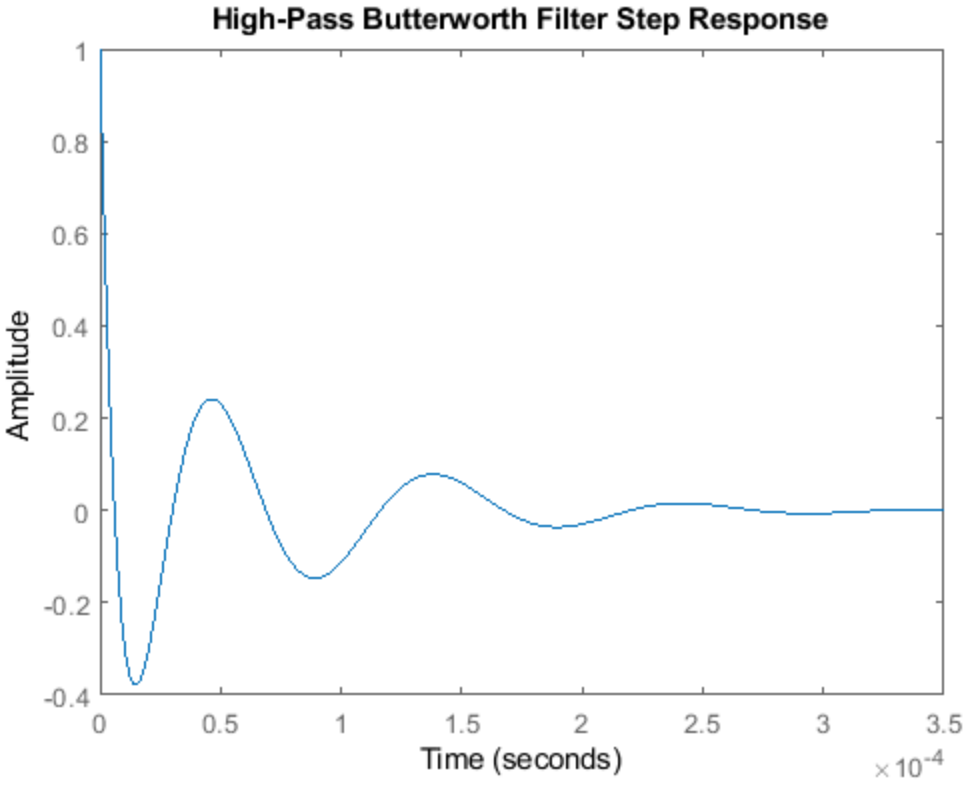
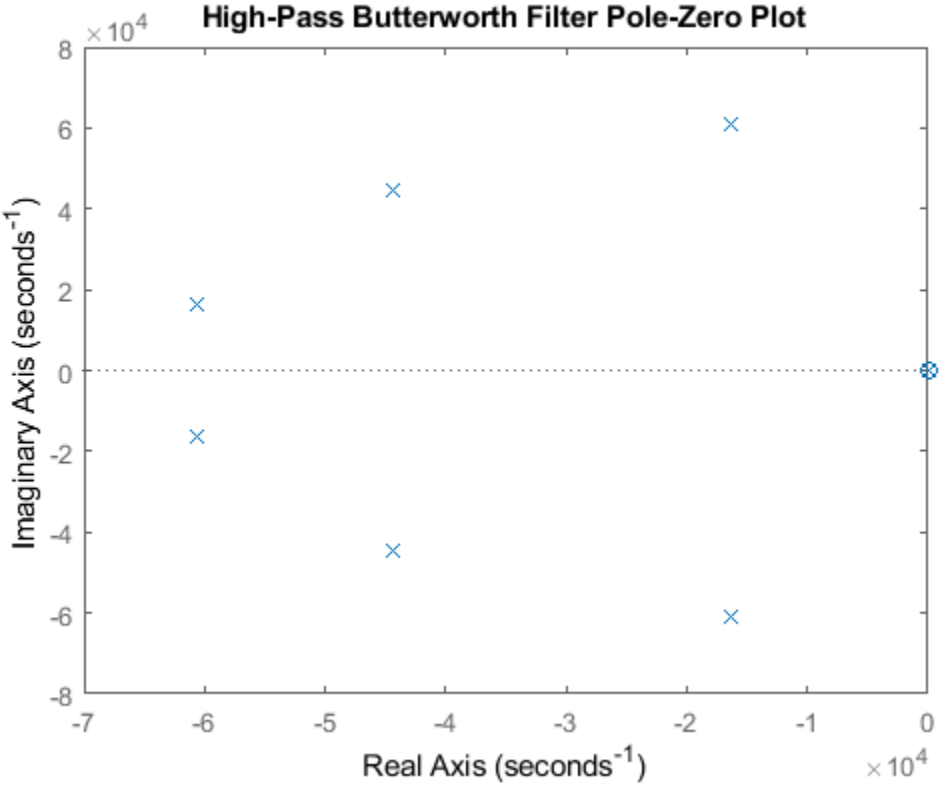
```
%Transfer Function Analysis for High-Pass 6th Order Butterworth Filter
%ECE223 Sp19, Jennifer Jordan & David Lay

s = tf('s');
x = (62831.85/s); %LP to HP transformation condition
H = 1/((x^2+.5176*x+1)*(x^2+1.4142*x+1)*(x^2+1.9319*x+1))
%Figures:
figure(1);
bode(H);
title('High-Pass Butterworth Filter Bode Plot');
figure(2);
impulse(H);
title('High-Pass Butterworth Filter Impulse Response');
figure(3);
step(H);
title('High-Pass Butterworth Filter Step Response');
figure(4);
pzplot(H);
title('High-Pass Butterworth Filter Pole-Zero Plot');
```

```
H =

                                    s^9

  ------------------------------------------------------------------------

   s^9 + 2.428e05 s^8 + 2.947e10 s^7 + 2.268e15 s^6 + 1.163e20 s^5

                                                + 3.784e24 s^4 + 6.153e28
  s^3

Continuous-time transfer function.
```


High-Pass Butterworth Filter Bode Plot
Magnitude (dB)
0
-50
-100
-150
-200
-250
Phase (deg)
540
360
180
0
10^3
10^4
10^5
10^6
Frequency (rad/s)


High-Pass Butterworth Filter Impulse Response
$\times 10^5$
0.5
0
-0.5
-1
-1.5
-2
-2.5
Amplitude
0
0.5
1
1.5
2
2.5
Time (seconds)
$\times 10^{-4}$


High-Pass Butterworth Filter Step Response
Amplitude
Time (seconds)
×10^-4
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5


High-Pass Butterworth Filter Pole-Zero Plot
×10^4
Imaginary Axis (seconds^-1)
Real Axis (seconds^-1)
×10^4
8
6
4
2
0
-2
-4
-6
-8
-7
-6
-5
-4
-3
-2
-1
0

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