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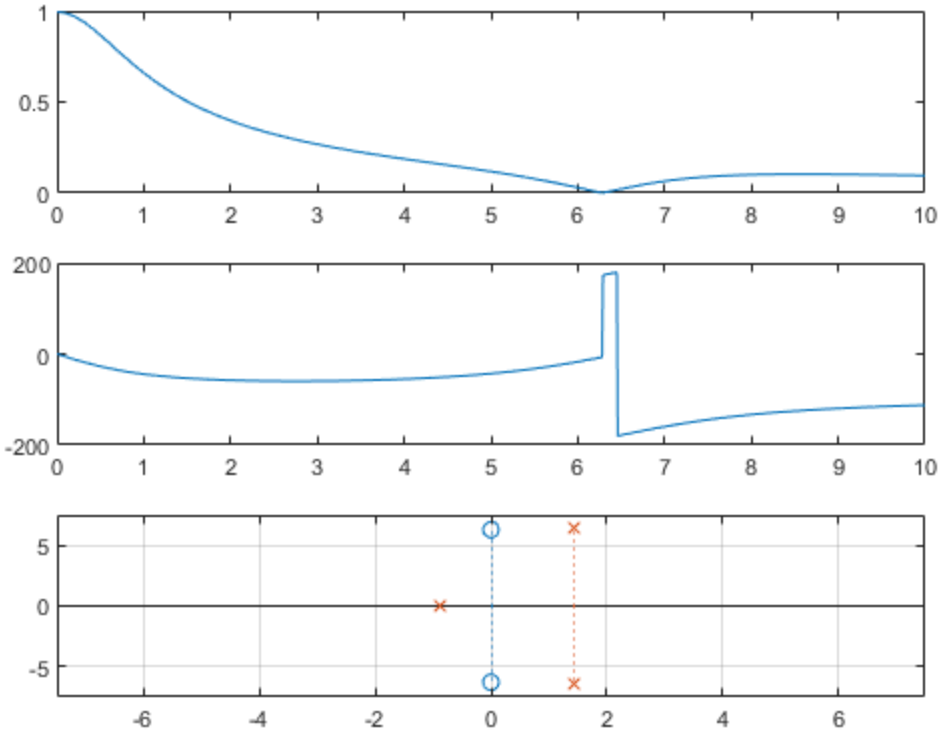
Header

Nolan Anderson CPE 381 - 01 Homework 4 # 1

```
clear all; clf
m = 10;
```

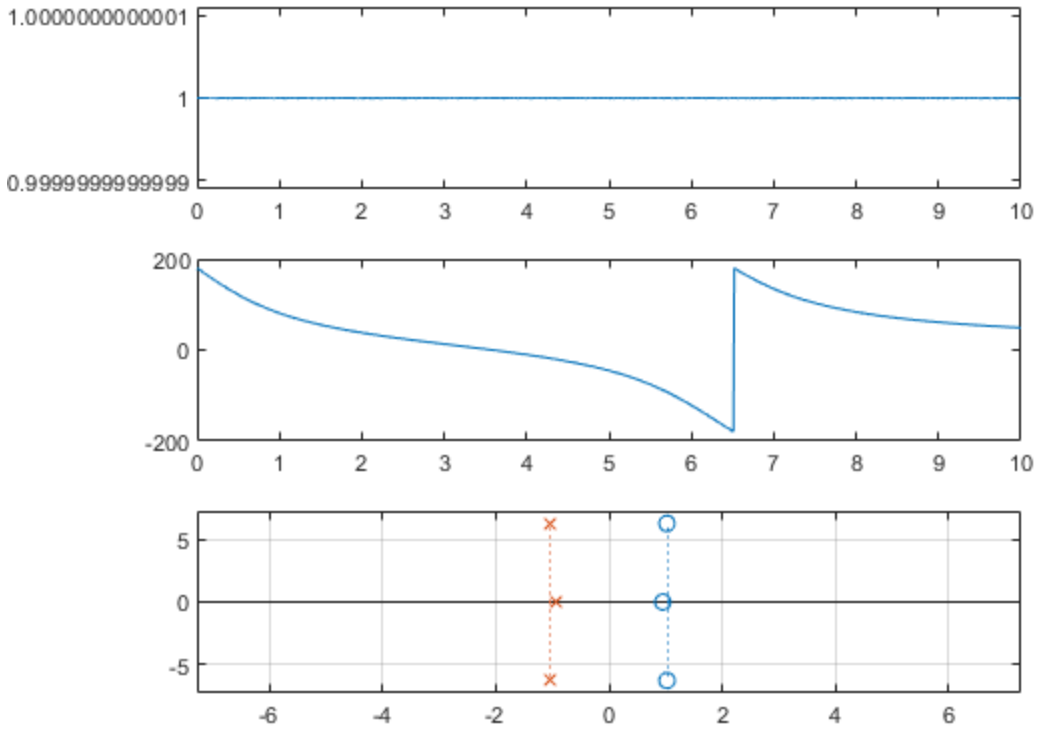
H1

```
n1 = [0 1 0 4*pi^2];
d1 = [1 -2 2.25+4*pi^2 4*pi^2+0.25];
figure(1)
freq(n1,d1,m);
```



H2

```
n2 = [1 -3 3+4*pi^2 -(4*pi^2-1)];
d2 = [1 3 3+4*pi^2 4*pi^2-1];
figure(2)
freq(n2,d2,m);
```

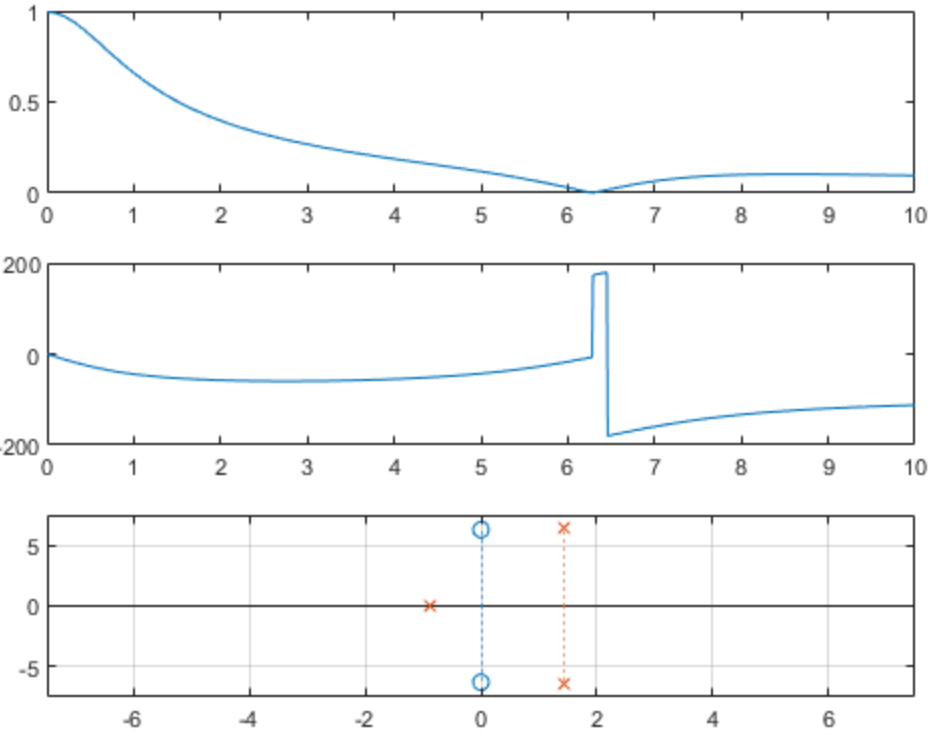


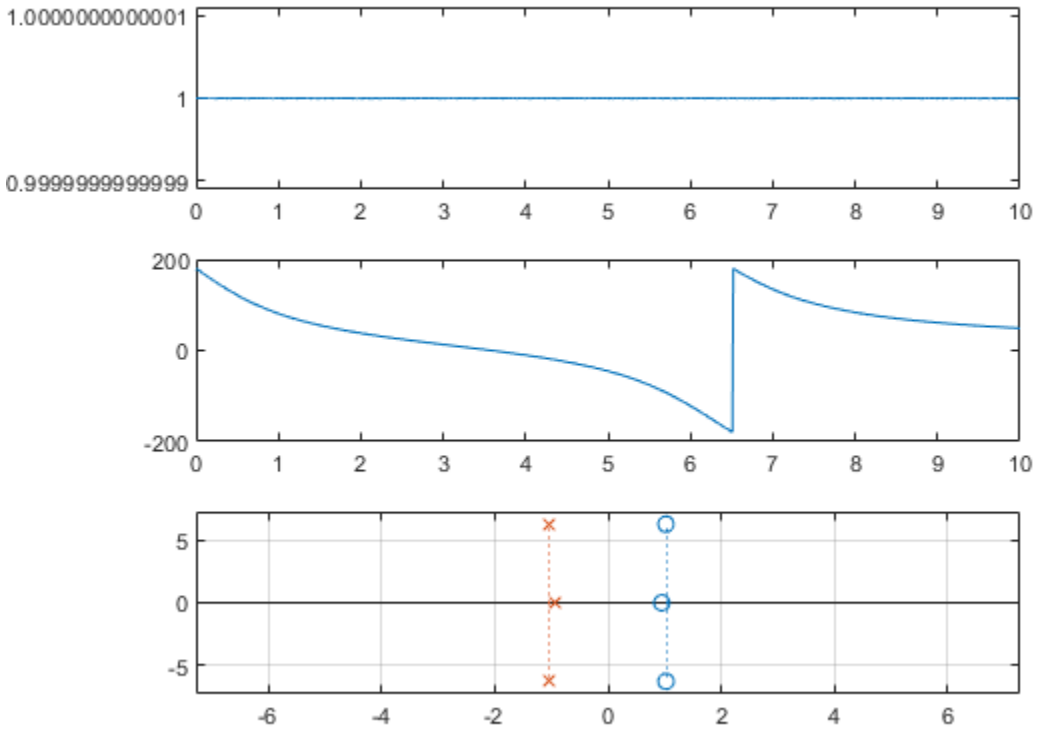
H3

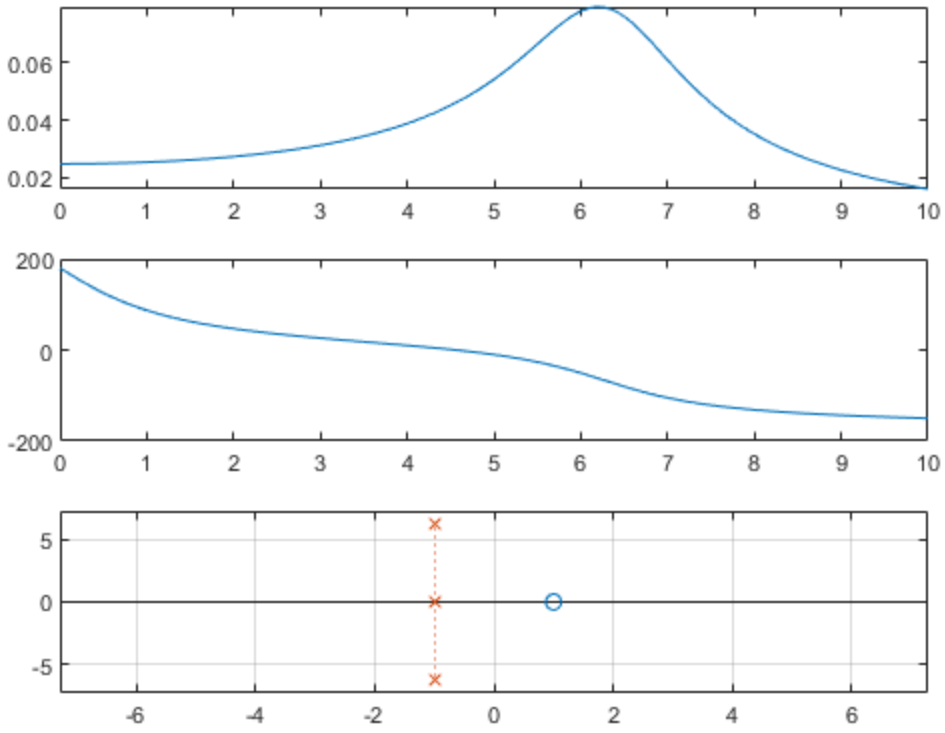
```
n3 = [0 0 1 -1];
d3 = [1 3 4*pi^2+3 4*pi^2+1];
figure(3)
freq(n3,d3,m);
```

Frequency Function

```
function[w,Hm,Ha]=freq(b,a,max)
    w = 0:0.01:max;
    H = freqs(b,a,w);
    Hm = abs(H);
    Ha = angle(H)*180/pi;
    subplot(311);
    plot(w,Hm);
    subplot(312);
    plot(w,Ha);
    subplot(313);
    splane(b,a);
end
```


1
0.5
0
0 1 2 3 4 5 6 7 8 9 10
200
0
-200
0 1 2 3 4 5 6 7 8 9 10
5
0
-5
-6 -4 -2 0 2 4 6


1.0000000000001
1
0.9999999999999
0 1 2 3 4 5 6 7 8 9 10
200
0
-200
0 1 2 3 4 5 6 7 8 9 10
5
0
-5
-6 -4 -2 0 2 4 6



Splane function

```
function splane(num,den)
    z=roots(num);
    p=roots(den);
    A1=[min(imag(z)) min(imag(p))];A1=min(A1)-1;
    B1=[max(imag(z)) max(imag(p))];B1=max(B1)+1;
    N=20;
    D=(abs(A1)+abs(B1))/N;
    im=A1:D:B1;
    Nq=length(im);
    re=zeros(1,Nq);
    A=[min(real(z)) min(real(p))];A=min(A)-1;
    B=[max(real(z)) max(real(p))];B=max(B)+1;
    stem(real(z),imag(z),'o:');
    hold on
    stem(real(p),imag(p),'x:');
    hold on
    grid
    axis([min(im) max(im) min(im) max(im)]);
    hold off
end
```

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