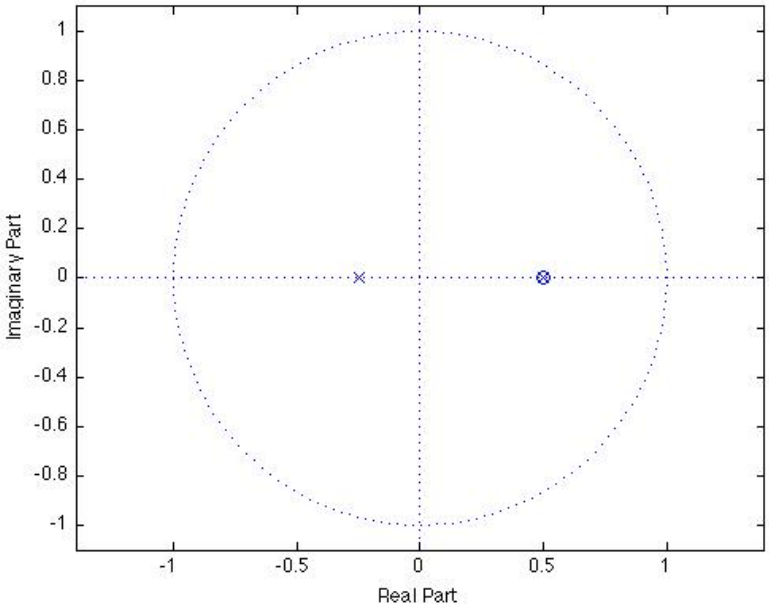
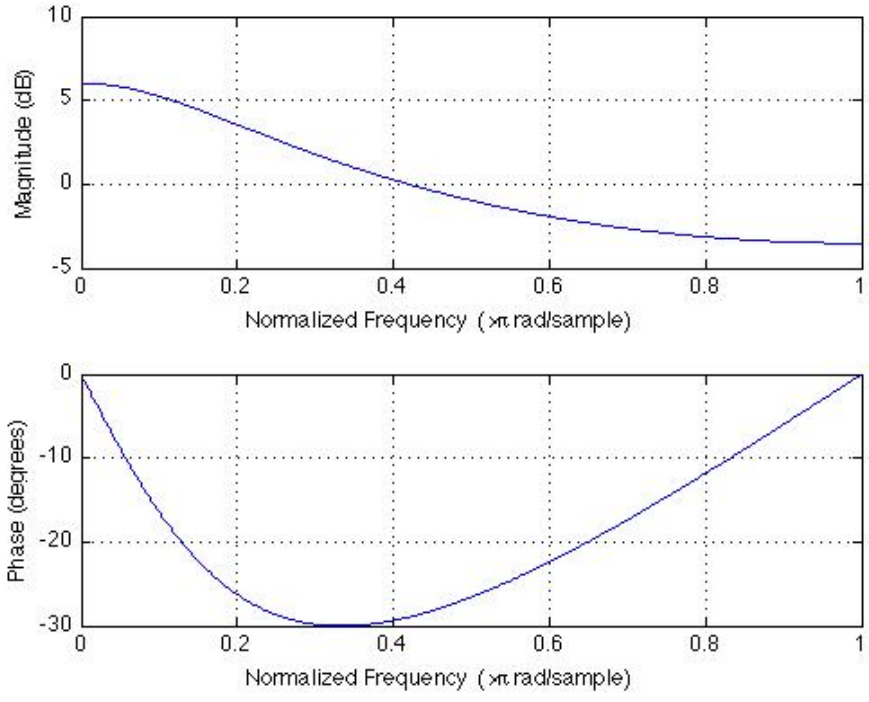
Problem 1

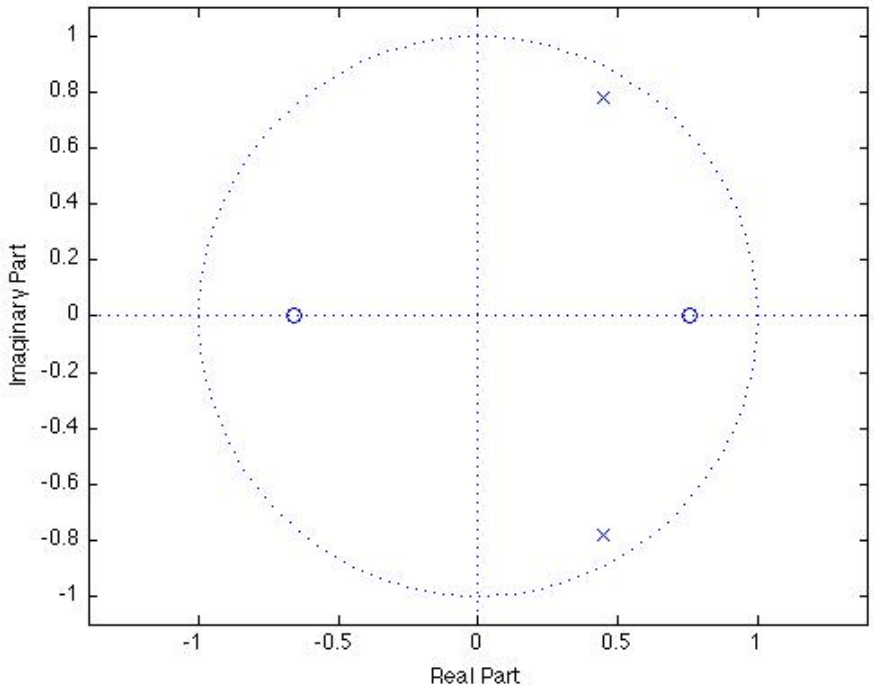


Pole-Zero Plot

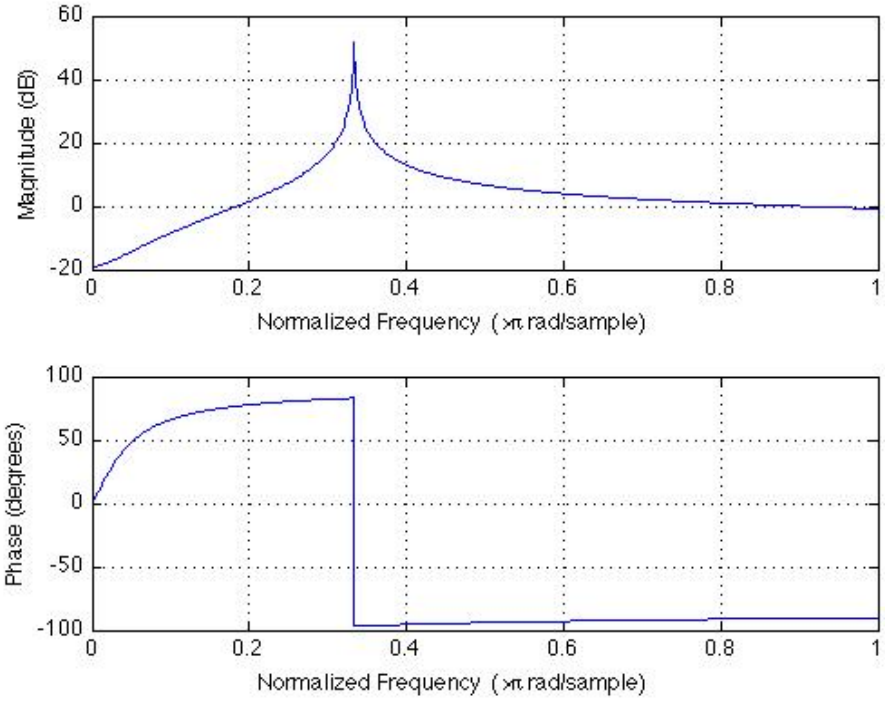


Magnitude and Phase Plot

Problem 2

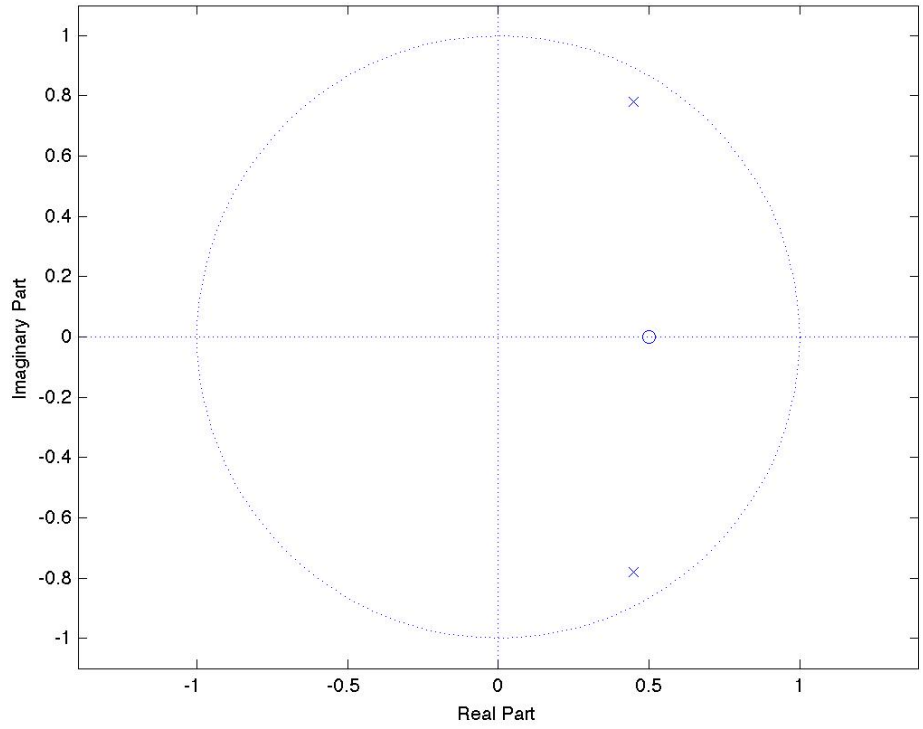


Pole Zero Plot

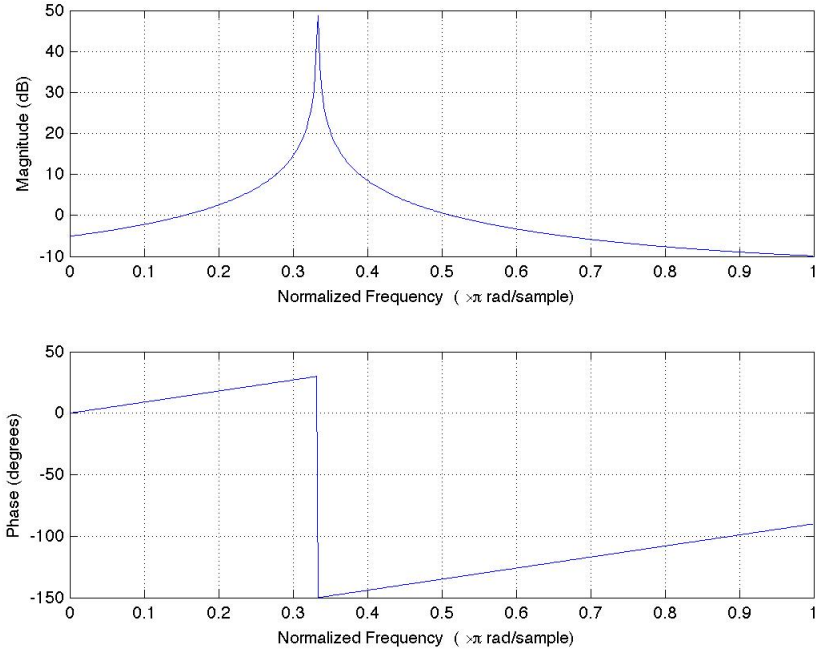


Magnitude And Phase Plot

Problem 3



Pole Zero Plot



Magnitude and Phase Plot

Source Code:

```
T=1/fs;
t=0:T:2;
Y=[1 -0.5];
X=[1 -.9 .81];
disp(roots(Y));
disp(roots(X));
N=roots(Y);
D=roots(X);
zplane(N,D);
freqz(N,D);
[y fs
nbits]=wavread('/Users/muestudent/Desktop/Connor502Lab3/con
nor502lab3sound5.wav');
filteredsignal=filter(Y,X,y);F=abs(fft(filteredsignal));
plot(F);

Y=[1 -.1 -.5]
X=[1 -.9 .81]
disp(roots(Y));
disp(roots(X));
N=roots(Y);
D=roots(X);
zplane(N,D);
freqz(N,D);
Y=[1 -1.618 1];
X=[1 -.9164 .87832];
zplane(N,D);
freqz(N,D);
filteredsignal=filter(Y,X,y);
F=abs(fft(filteredsignal));
plot(F);

Y=[1 -0.5];
X=[1 -.9 .81];
disp(roots(Y));
disp(roots(X));
N=roots(Y);
D=roots(X);
zplane(N,D);
freqz(N,D);
filteredsignal=(filter(Y,X,y));
F=abs(fft(filteredsignal));
plot(F);
```

Writeup:

The first problem, which has only real poles and zeros, has a very smooth frequency response. The second problem, with two real zeros and two complex poles has a sharp spike in frequency response at .3 pi radians and also a large change in phase. The third problem has a similar phenomena from 1 real zero and two complex poles. As expected, the frequency response of the input wave file conformed to the response of the respective filters.