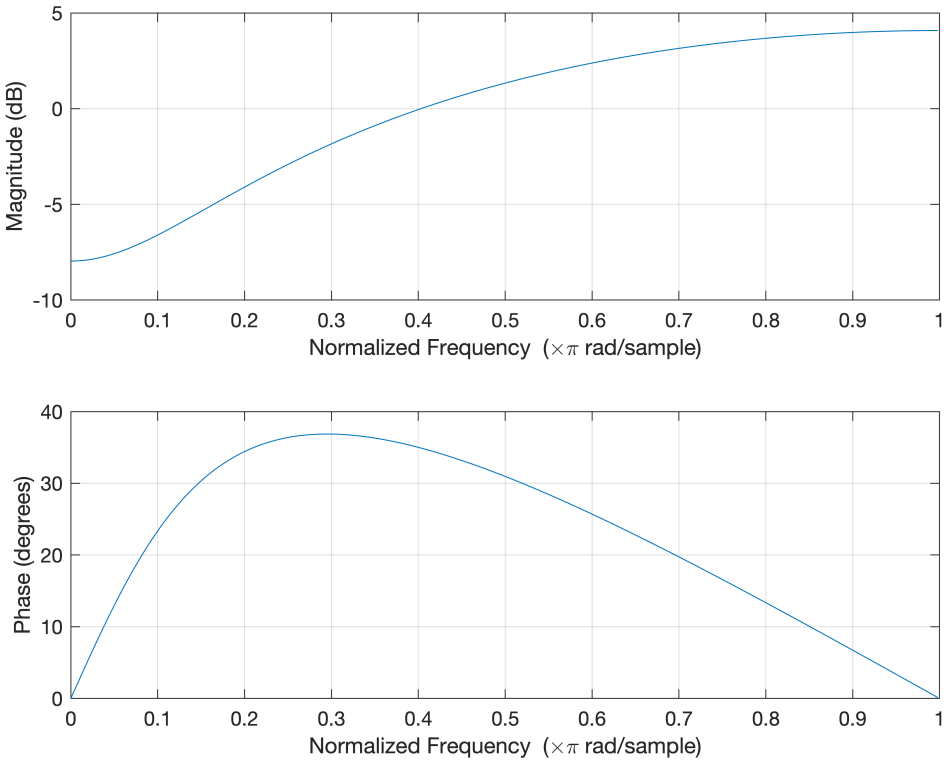
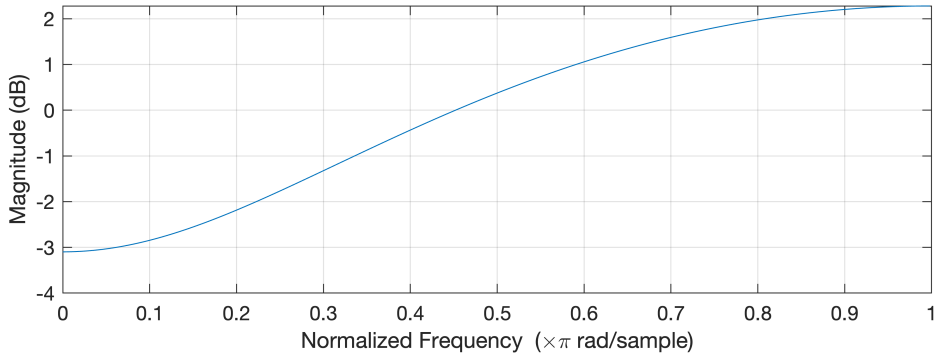
Problem 1:

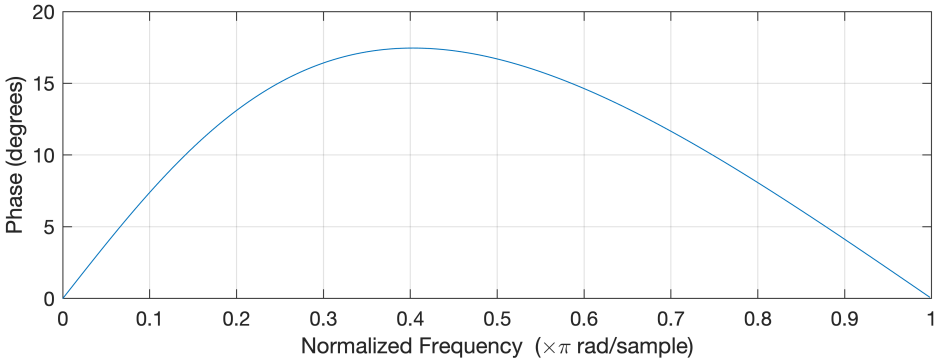
```
figure(1);
freqz([1 -0.6], 1);
```



when a is 0.6, this is a highpass filter (low frequencies attenuated + high frequencies ampiified)

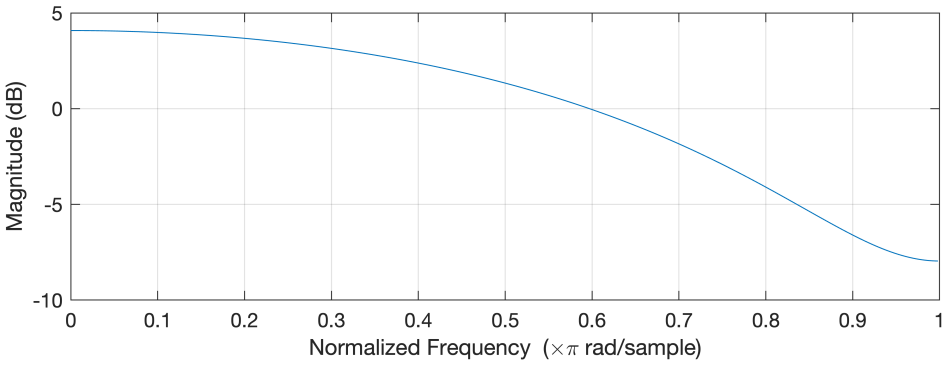
```
figure(2);
freqz([1 -0.3], 1);
```

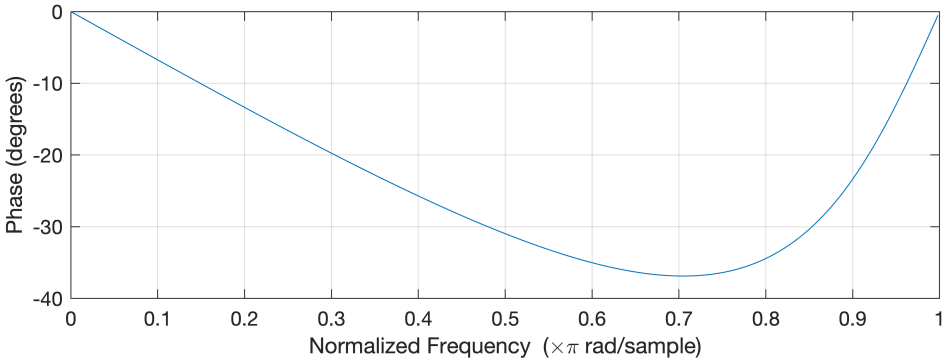




when a is 0.3, this is a highpass filter (same reason as above)

```
figure(3);
freqz([1 0.6], 1);
```





when a is -0.6, this is a lowpass filter (low frequencies are allowed through + high frequencies are attenuated)

Problem 2:

Preemphasis filter attenuates low frequencies in female speech making the overall sound more tinny and higher pitched

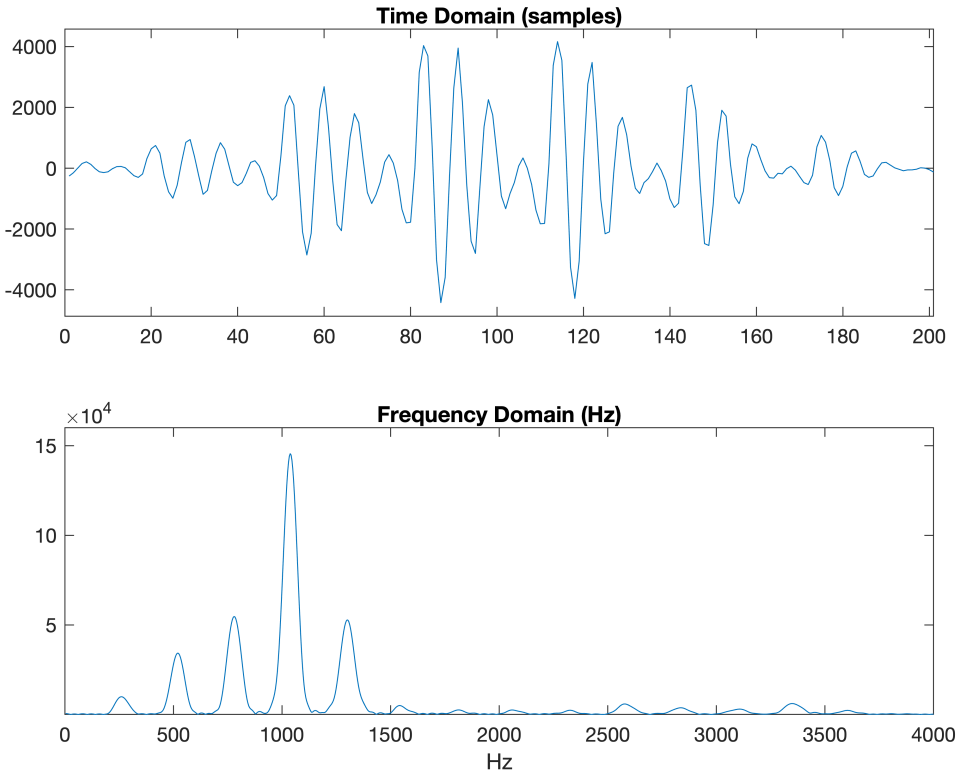
Problem 3:

```
load_in;
```

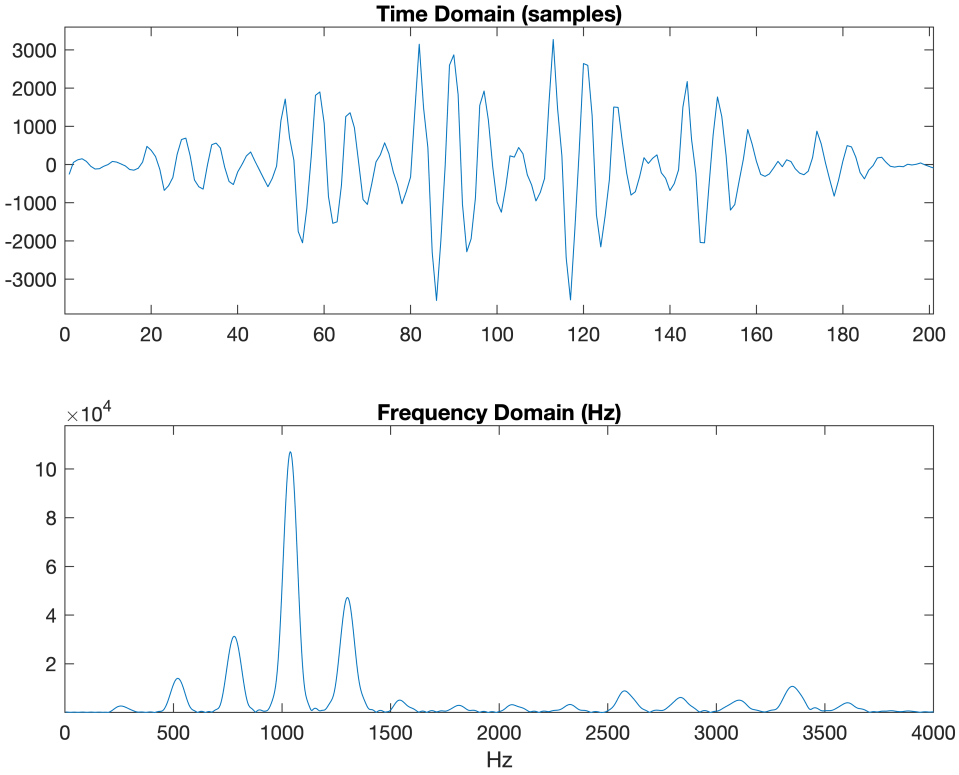
```
  Name                  Size              Bytes  Class     Attributes

  ans                   1x1                   8  double
  female_a            201x1                1608  double
  female_sentence   31745x1              253960  double
  fid                   1x1                   8  double
  male_a              201x1                1608  double
```

```
figure(4);
zpfft(female_a, 8000, 10);
```




```
out_a = filter([1 -0.8], 1, female_a);
figure(5);
zpfft(out_a, 8000, 10);
```



Preemphasis attenuates lower frequencies of /a/ when they occur as peaks in the lower magnitude of the frequency domain. When they occur in the higher frequencies, they are not affected as severely. At 500 Hz, we see the peak much smaller, but at 1500 we see the peak staying the same.