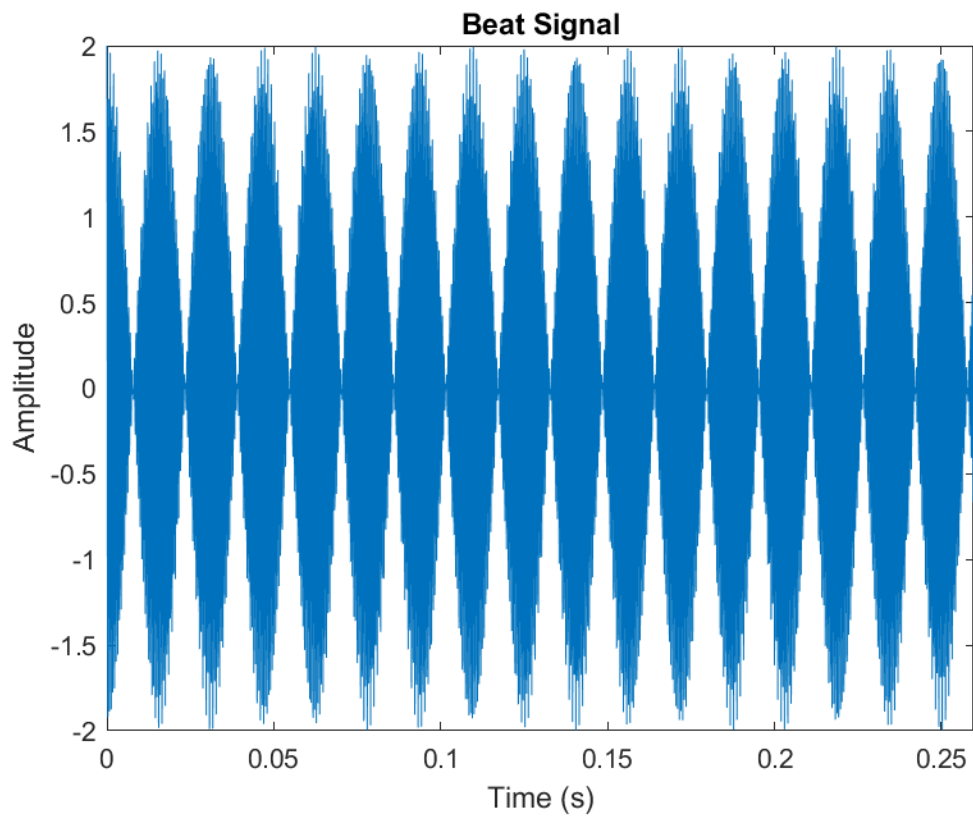


DSP LAB 2 REPORT

SECTION 4.2

```
function [xx, tt] = mychirp(f1, f2, dur, fsamp)
    tt = 0:1/fsamp:dur;
    mu = (f2-f1)/(dur*2);
    %% assuming phi is 100 and amplitude of 1
    psi = 2*pi*(mu*tt.*tt + f1*tt + 100);
    xx = real( 1*exp(j*psi) );

end
```



```

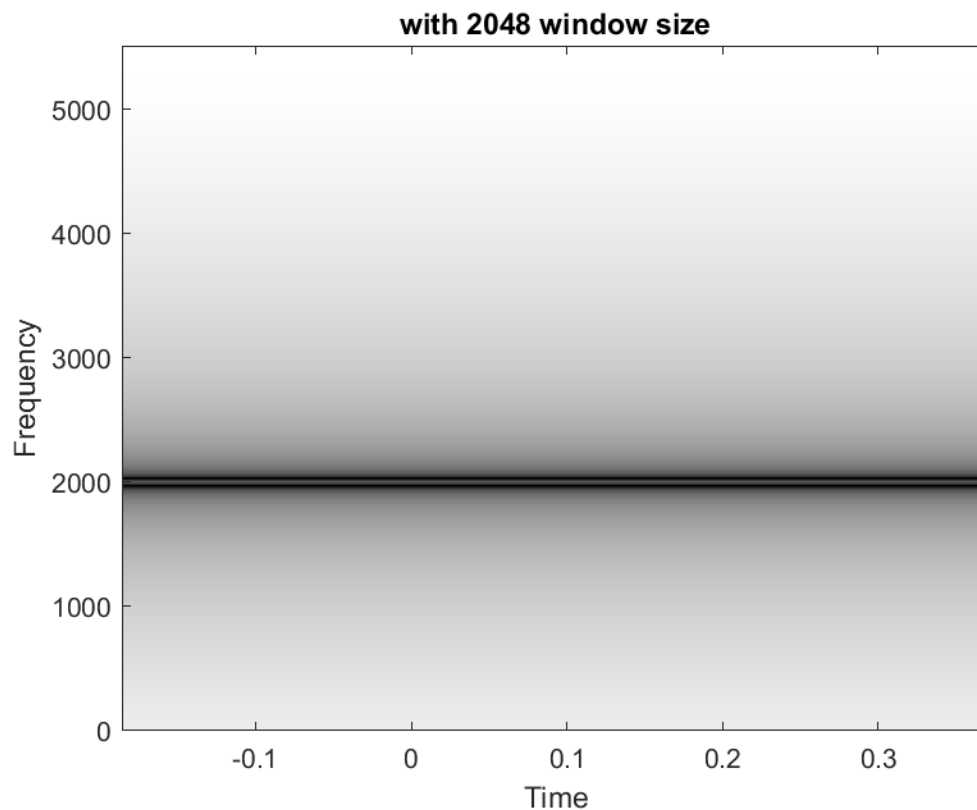
[xx, tt] = beat(1, 1, 2000, 32, 11025, 0.26);

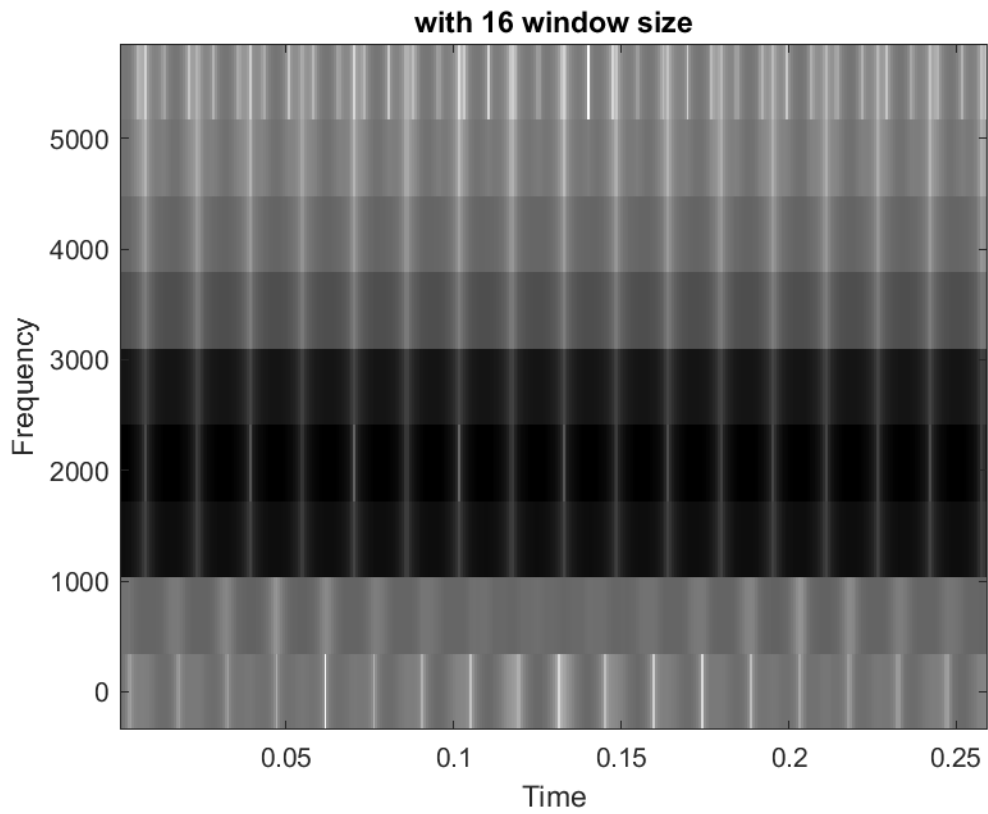
figure;
plot(tt, xx);
title('Beat Signal');
xlabel('Time (s)');
ylabel('Amplitude');
xlim([0, 0.26]);
print('C:\Users\Freedom Academy\Documents\LAB\lab4.4.0_plot', '-dpng');

figure;
specgram(xx, 2048, fsamp);
colormap(1-gray(256));
title('with 2048 window size');
print('C:\Users\Freedom Academy\Documents\LAB\lab4_2_1', '-dpng');

figure;
specgram(xx, 16, fsamp);
colormap(1-gray(256));
title('with 16 window size');
print('C:\Users\Freedom Academy\Documents\LAB\lab4_2_2', '-dpng');

```





The spectrogram with the small window size does not properly show the frequency present but the spectrogram with the bigger window size does.

SECTION 4.3

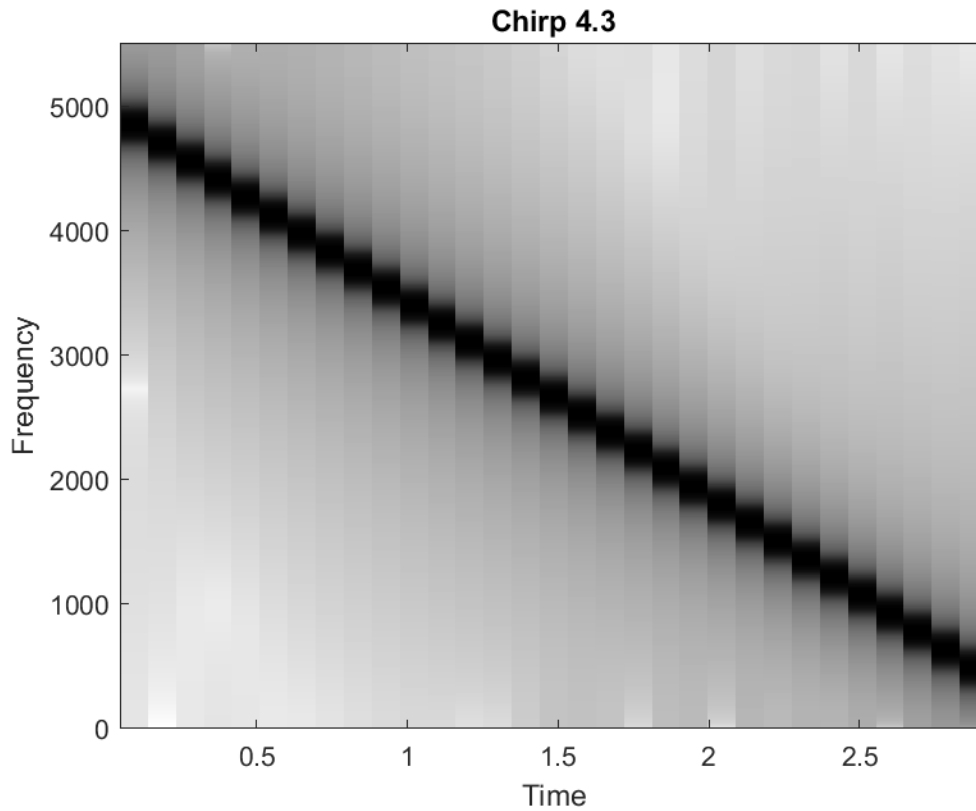
```
function [xx, tt] = mychirp(f1, f2, dur, fsamp)
    tt = 0:1/fsamp:dur;
    mu = (f2-f1)/(dur*2);
    %% assuming phi is 100 and amplitude of 1
    psi = 2*pi*(mu*tt.*tt + f1*tt + 100);
    xx = real( 1*exp(j*psi) );

end
```

```
f1 = 5000;
f2 = 300;
dur = 3;
fsamp = 11025;

[xx, tt] = mychirp(f1,f2, dur, fsamp);
soundsc(xx, 11025);

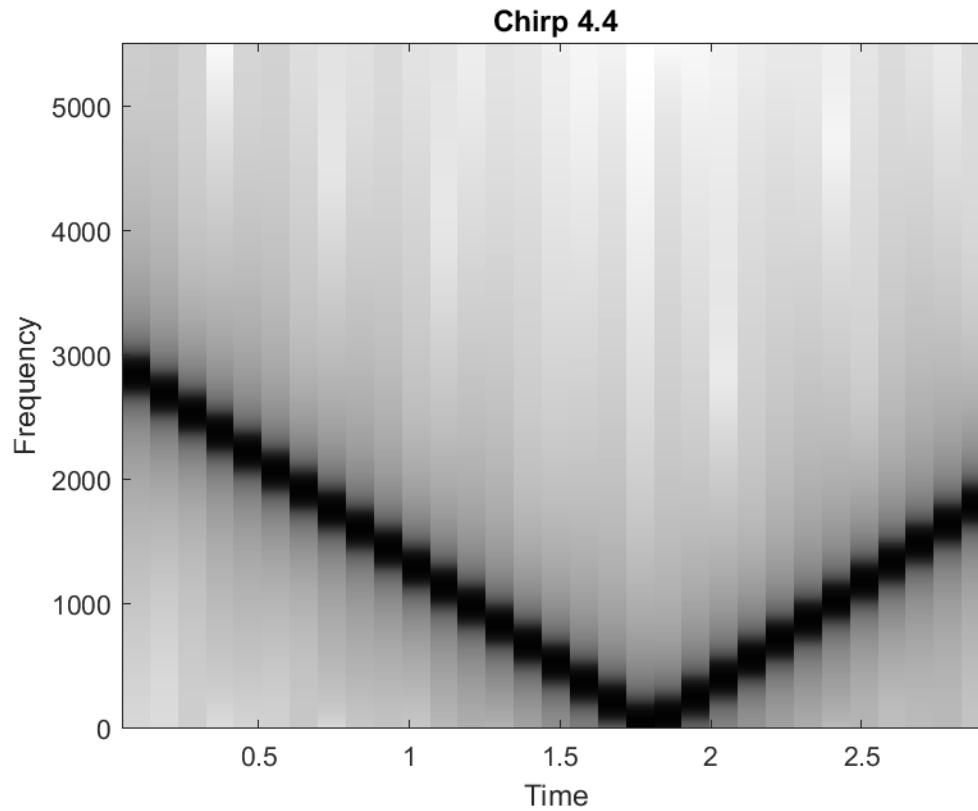
figure;
specgram(xx, 2048, fsamp);
colormap(1-gray(256));
title('Chirp 4.3');
print('C:\Users\Freedom Academy\Documents\LAB\lab2_4_3',
'-dpng');
```



The frequency varies directly proportional to time but it decreases with time, which means that the gradient is negative. The pitch of the sound heard decreases when played with soundsc.

SECTION 4.4

The soundsc plays a sound that initially has a higher pitch which decreases with time. It however increases after some time. The spectrogram shows that this occur between $t = 1.5$ and 2.



```
f1 = 3000;  
f2 = -2000;  
dur = 3;  
fsamp = 11025;  
  
[xx, tt] = mychirp(f1,f2, dur, fsamp);  
soundsc(xx, fsamp);  
  
figure;  
specgram(xx, 2048, fsamp);  
colormap(1-gray(256));  
title('Chirp 4.4');  
print('C:\Users\Freedom Academy\Documents\LAB\lab4.4', '-dpng');
```