

test

May 20, 2022

```
[ ]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import IPython.display as ipd
plt.rcParams['figure.figsize'] = (10, 5)
```

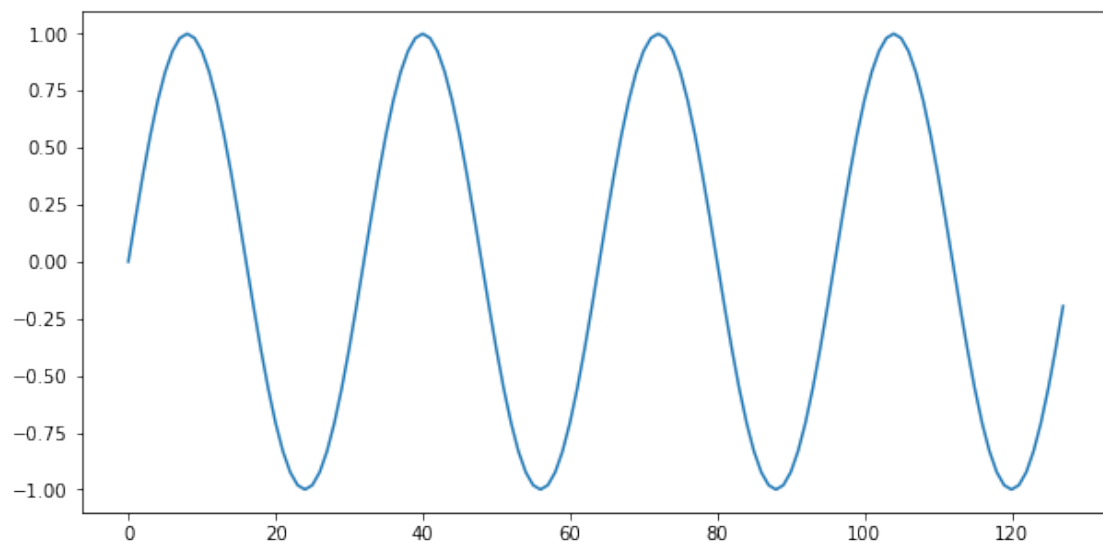
0.1 FFT tests

0.1.1 Sinewave

```
[ ]: data = pd.read_csv('../results/tests/fft_sinewave.csv', header=None)
size = data.shape[0]
print(size)
freq = range(0, size, 1)
plt.plot(freq, data[0][:size])
```

128

```
[ ]: [<matplotlib.lines.Line2D at 0x7fbe80691070>]
```

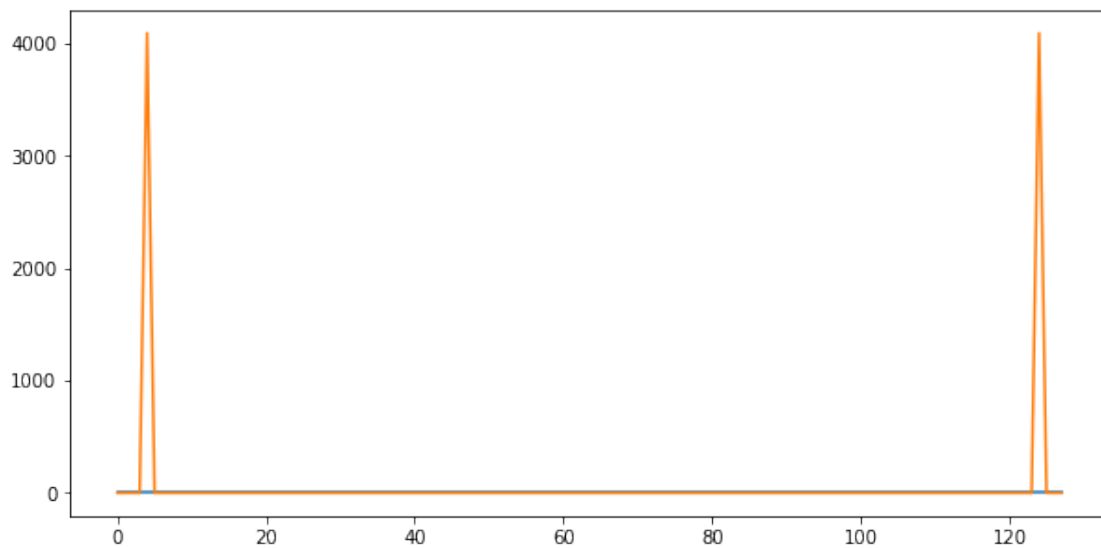


```
[ ]: data = pd.read_csv('../results/tests/fft_fftsinewave.csv', header=None).
      ↪to_numpy()
      size = data.shape[0]
      print(data.shape)

      freq = range(0, size, 1)
      plt.plot(freq, np.abs(data[:size])**2)
```

(128, 2)

```
[ ]: [<matplotlib.lines.Line2D at 0x7fbe82c10460>,
      <matplotlib.lines.Line2D at 0x7fbe82c10580>]
```

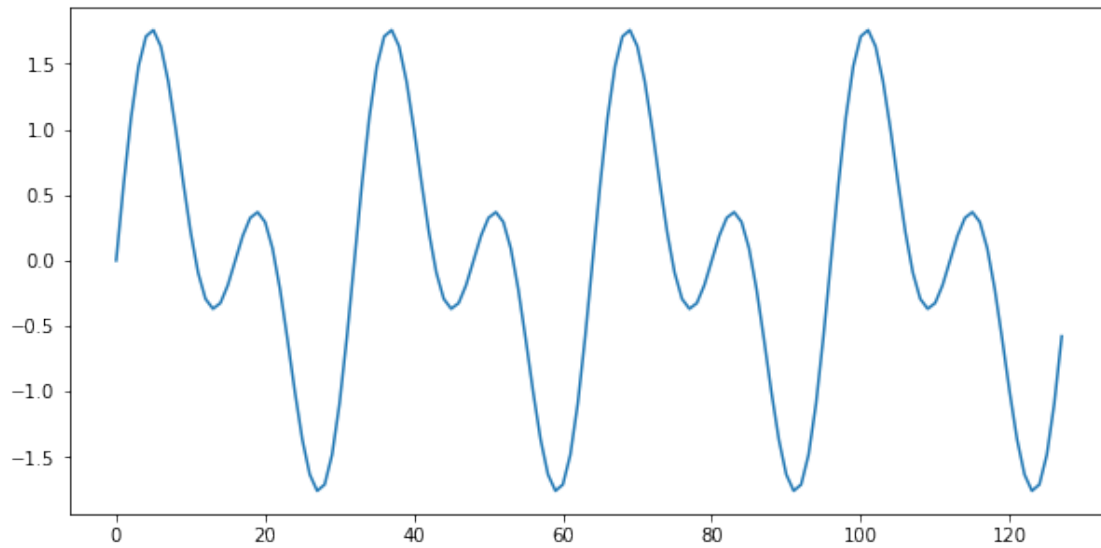


0.1.2 Wave sum

```
[ ]: data = pd.read_csv('../results/tests/fft_wavesum.csv', header=None)
      size = data.shape[0]
      print(size)
      freq = range(0, size, 1)
      plt.plot(freq, data[0][:size])
```

128

```
[ ]: [<matplotlib.lines.Line2D at 0x7fbe82be92e0>]
```

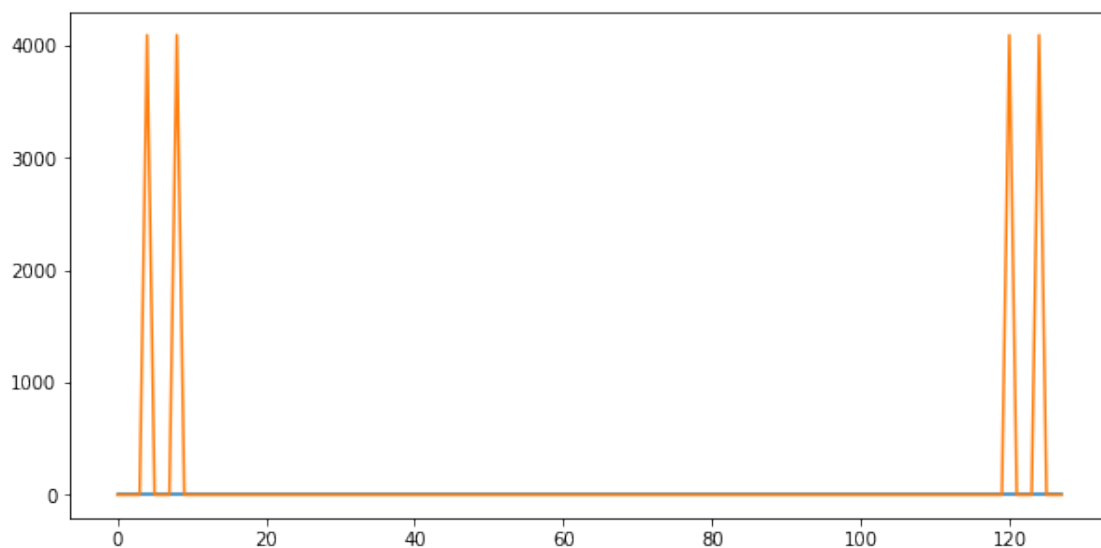


```
[ ]: data = pd.read_csv('../results/tests/fft_fftwavesum.csv', header=None).
      ↳to_numpy()
      size = data.shape[0]
      print(size)

      freq = range(0, size, 1)
      plt.plot(freq, np.abs(data[:size])**2)
```

128

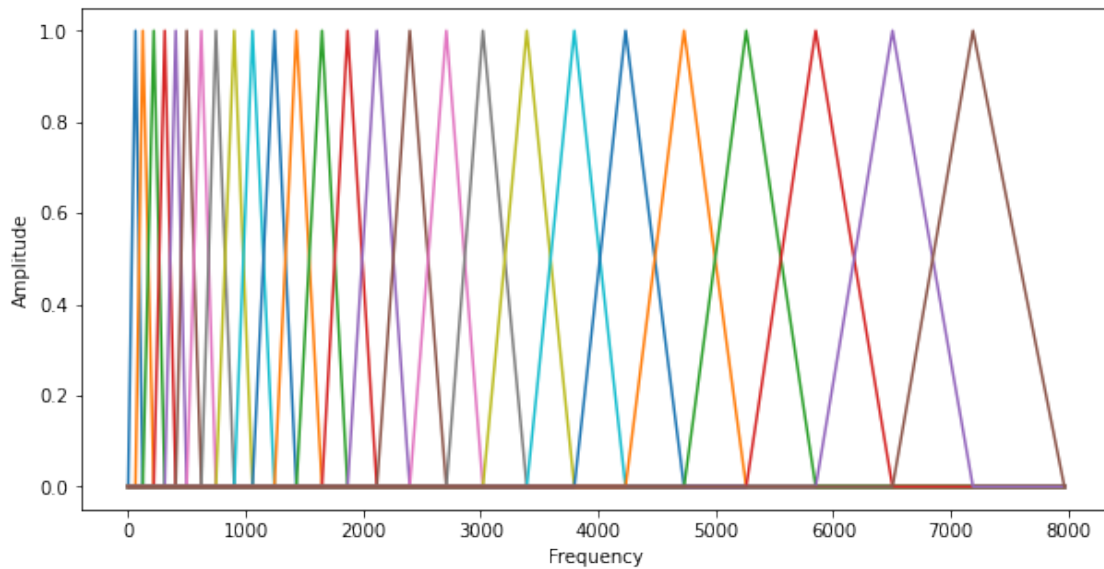
```
[ ]: [<matplotlib.lines.Line2D at 0x7fbe805e8a30>,
      <matplotlib.lines.Line2D at 0x7fbe805e8a90>]
```



0.2 Mel coefficients

0.2.1 Filterbank

```
[ ]: data = pd.read_csv('../results/tests/filterbank.csv', header=None).to_numpy()
plt.plot(data[0:257,:]);
plt.xticks(np.arange(0,258,32.125), np.arange(0,8001,1000));
plt.xlabel("Frequency");
plt.ylabel("Amplitude");
```



Lets compare the spectrograms generated with mel scale for different audios of the same word

happy0

```
[ ]: ipd.Audio('../data/samples/happy0.wav')
```

```
[ ]: <IPython.lib.display.Audio object>
```

happy1

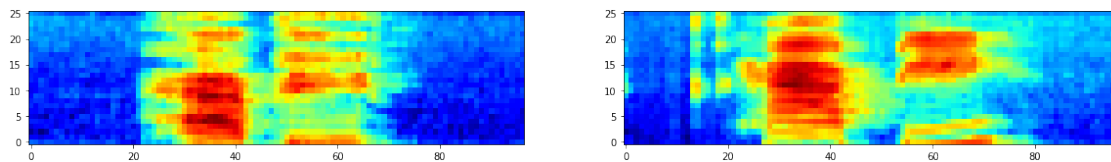
```
[ ]: ipd.Audio('../data/samples/happy1.wav')
```

```
[ ]: <IPython.lib.display.Audio object>
```

0.2.2 Mel spectrograms

```
[ ]: data = pd.read_csv('../results/tests/happy0_spectrogram.csv', header=None).  
      ↪to_numpy().transpose()  
fig = plt.figure(figsize=(20,15))  
fig.add_subplot(1, 2, 1)  
plt.imshow(data, origin='lower', cmap='jet')  
data = pd.read_csv('../results/tests/happy1_spectrogram.csv', header=None).  
      ↪to_numpy().transpose()  
fig.add_subplot(1, 2, 2)  
plt.imshow(data, origin='lower', cmap='jet')
```

```
[ ]: <matplotlib.image.AxesImage at 0x7fbe71f9ef40>
```



0.2.3 Mel cepstral coefficients

```
[ ]: data = pd.read_csv('../results/tests/happy0_mfcc.csv', header=None).to_numpy().  
      ↪transpose()  
fig = plt.figure(figsize=(20,15))  
fig.add_subplot(1, 2, 1)  
plt.imshow(data, origin='lower', cmap='jet')  
data = pd.read_csv('../results/tests/happy1_mfcc.csv', header=None).to_numpy().  
      ↪transpose()  
fig.add_subplot(1, 2, 2)  
plt.imshow(data, origin='lower', cmap='jet')
```

```
[ ]: <matplotlib.image.AxesImage at 0x7fbe71e94dc0>
```

