NATIONAL INSTITUTE OF TECHNOLOGY SURATHKAL

MANGALORE, KARNATAKA-575025

LAB ASSIGNMENT :-02

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COURSE :- B.TECH (INFORMATION TECHNOLOGY)

SUBJECT :- IT204 (SIGNALS AND SYSTEM LAB)

SUBMITTED TO :-

REVANESHA M SIR

```
import numpy as np
from scipy.fftpack import fft, ifft
from scipy import signal
import matplotlib.pyplot as plt



sr = 1000
ts = 1.0/sr
t = np.arange(0, 20, ts)
freq = 50
angfreq = 2 * np.pi * freq

x = np.sin(angfreq * t)

A = fft(x)
N= len(A)
n = np.arange(N)
T = N/sr
f=n/T

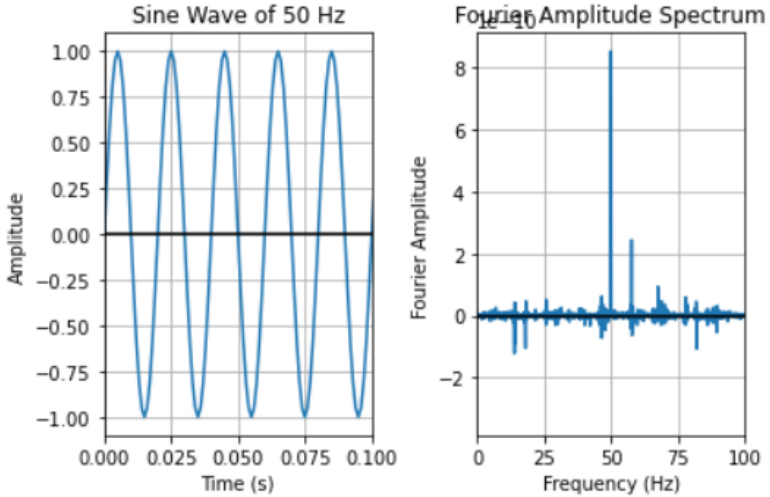
figure, axis= plt.subplots(1, 2)

axis[0].plot(t, x)
axis[0].set_title('Sine Wave of 50 Hz')
axis[0].grid()
axis[0].set_xlabel('Time (s)')
axis[0].set_ylabel('Amplitude')
axis[0].axhline(y = 0, color = 'k')
axis[0].set_xlim(0, 0.1)
```

```
axis[1].plot(f, A)
axis[1].set_title('Fourier Amplitude Spectrum')
axis[1].grid()
axis[1].set_xlabel('Frequency (Hz)')
axis[1].set_ylabel('Fourier Amplitude')
axis[1].axhline(y = 0, color = 'k')
axis[1].set_xlim(0, 100)

plt.tight_layout()
plt.show()
```

```
/usr/local/lib/python3.7/dist-packages/matplotlib/cbook/__init__.py:1317: ComplexWarning: Casting complex values to real discards the imaginary part
  return np.asarray(x, float)
```



```
import numpy as np
from scipy.fftpack import fft, ifft
from scipy import signal
import matplotlib.pyplot as plt



sr = 1000
ts = 1.0/sr
t = np.arange(0, 20, ts)
freq = 50
angfreq = 2 * np.pi * freq

x = signal.square (angfreq * t)

A = fft(x)
N= len(A)
n = np.arange(N)
T = N/sr
f=n/T

figure, axis= plt.subplots(1, 2)



axis[0].plot(t, x)
axis[0].set_title('Square Wave of 50 Hz')
axis[0].grid()
axis[0].set_xlabel('Time (s)')
axis[0].set_ylabel('Amplitude')
axis[0].axhline(y = 0, color = 'k')
axis[0].set_xlim(0, 0.1)
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```
axis[1].plot(f, A)
axis[1].set_title('Fourier Amplitude Spectrum')
axis[1].grid()
axis[1].set_xlabel('Frequency (Hz)')
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/usr/local/lib/python3.7/dist-packages/matplotlib/cbook/__init__.py:1317: ComplexWarning: Casting complex values to real discards the imaginary part
  return np.asarray(x, float)
(0.0, 100.0)
```