TUTORIAL-3

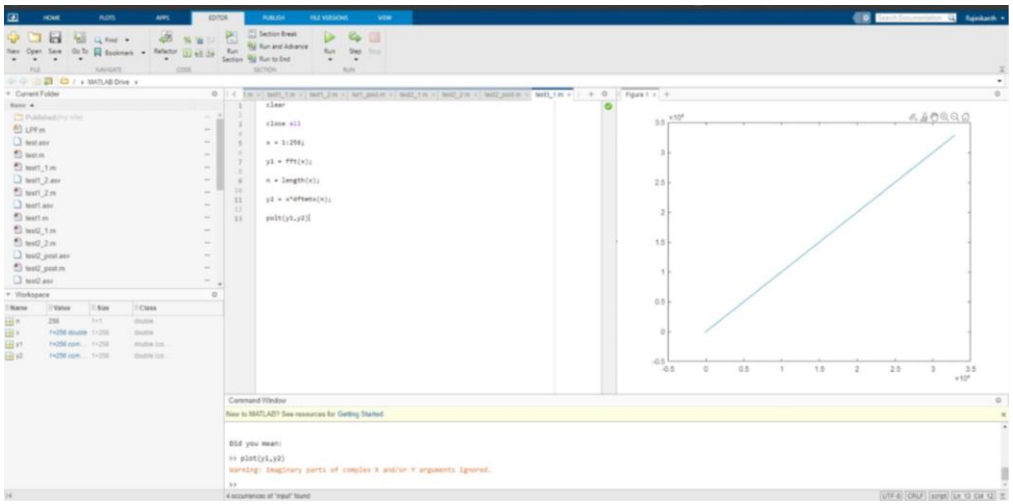
In-TUTORIAL:

1. Write a Write a MATLAB program to generate a 4X4 DFT matrix
   (a) Through the MATLAB program show that the generated DFT matrix is orthogonal
   (b) Plot t the convolved sequence in a separate figure window

```
x = 1:256;

y1 = fft(x);

n = length(x); y2
= x*dftmtx(n);
polt(y1,y2)
```

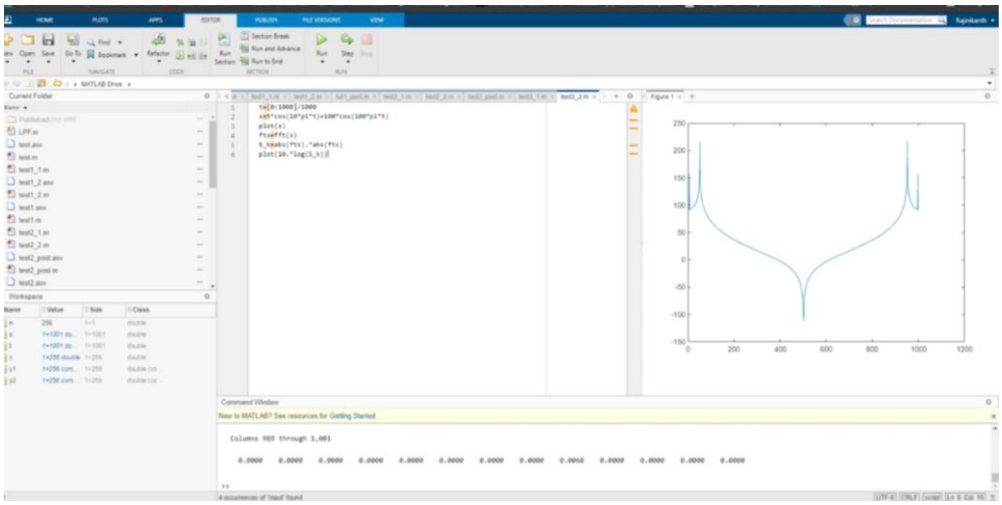


2. Write a MATLAB program to generate a signal,

$$s = 5\cos(10\pi t) + 10\cos(100\pi t)$$

   (a) Compute its Fourier transform
   (b) Plot magnitude and phase plot of the Fourier transform of the signal as subplots in a single figure window.

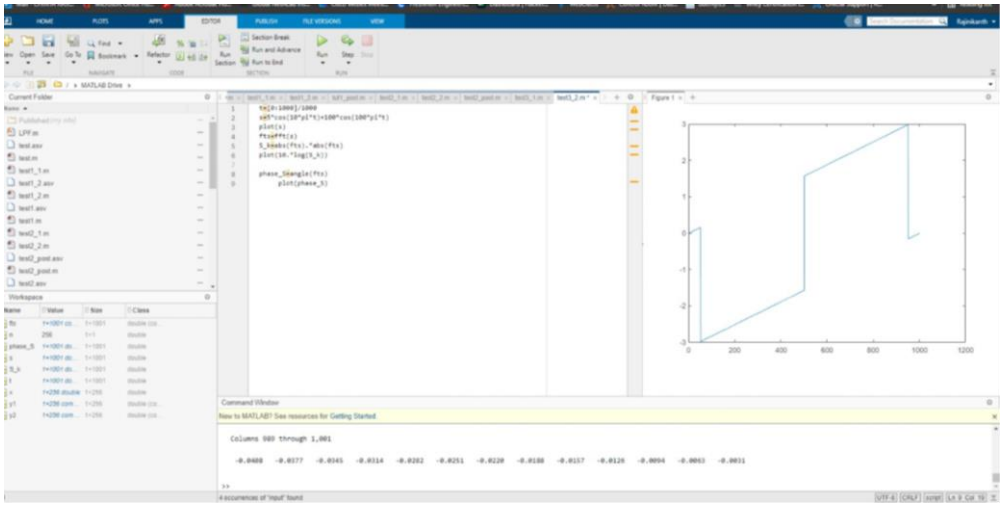
```
t=[0:1000]/1000
s=5*cos(10*pi*t)+100*cos(100*pi*t)
plot(s)
fts=fft(s)
S_k=abs(fts).*abs(fts)
plot(10.*log(S_k))
phase_S=angle(fts)
plot(phase_S)
```

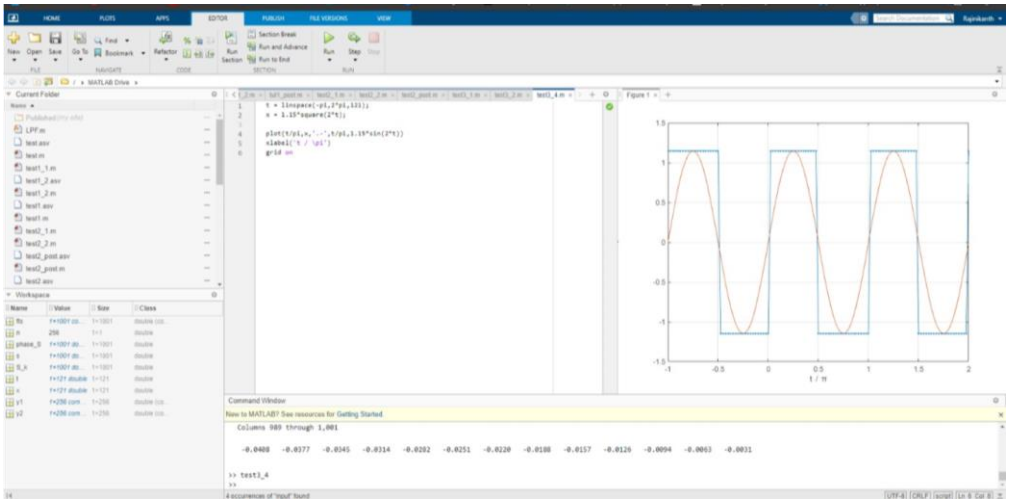


3. Write a MATLAB program to generate a square pulse having a width, τ =2.
   (a) Compute the Fourier transform.
   (b) Plot the Fourier transform
   (c) Show that the Fourier transform of the square pulse is the 'sinc' function

```
t = linspace(-pi,2*pi,121);
x = 1.15*square(2*t);

plot(t/pi,x,'.-',t/pi,1.15*sin(2*t))
xlabel('t / \pi') grid on
```

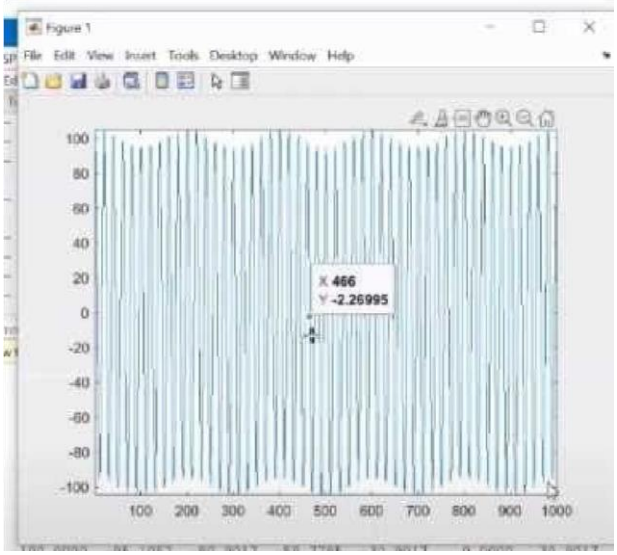


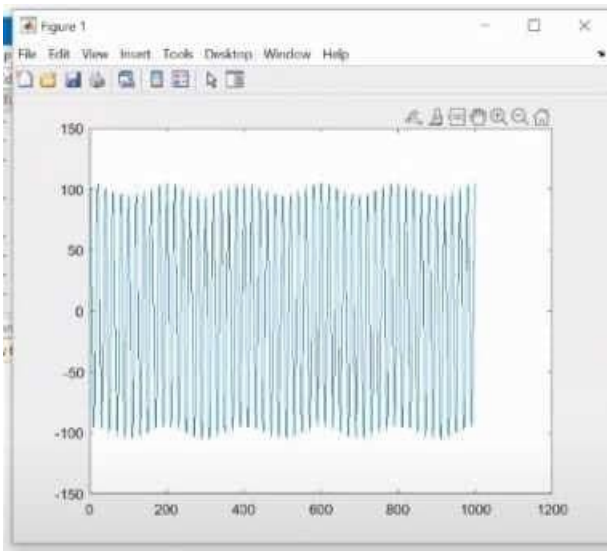


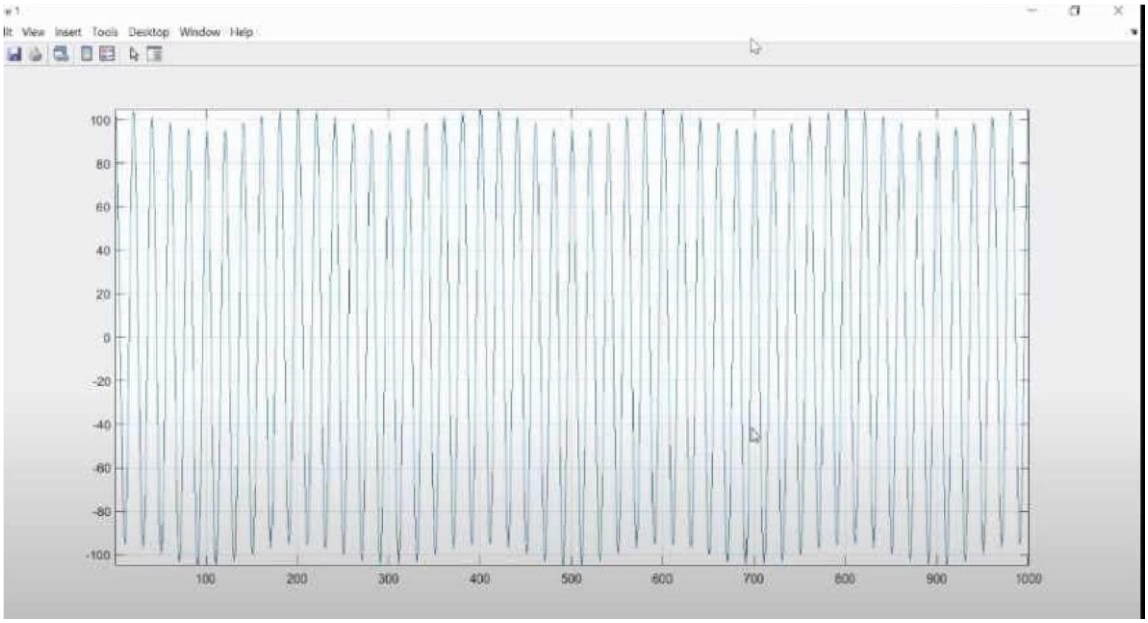
Post-TUTORIAL:

$$s = 10\cos(80\pi t)$$

1. Write Write a MATLAB program to generate
   (a) Plot the signal
   (b) Convolve the signal using a unit impulse sequence
   (c) Show the convolution properties of the Fourier transform
   (d) Plot the magnitude spectrum while demonstrating the convolution prperties



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