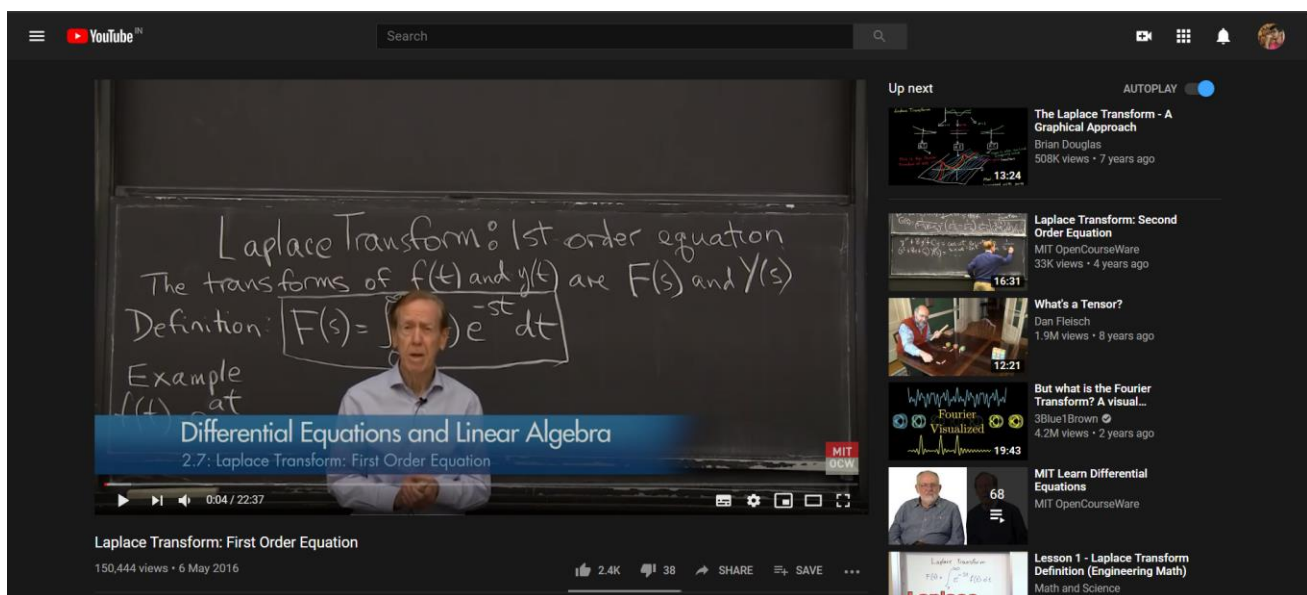


DAILY ASSESSMENT REPORT

Date:	26 May 2020	Name:	Gagan M K
Course:	DIGITAL SIGNAL PROCESSING	USN:	4AL17EC032
Topic:	<ul style="list-style-type: none"> • Fourier Series & Gibbs Phenomena using Python • Fourier Transform • Fourier Transform Derivatives • Fourier Transform and Convolution • Intuition of Fourier Transform and Laplace Transform • Laplace Transform of First order • Implementation of Laplace Transform using Matlab • Applications of Z-Transform • Find the Z-Transform of sequence using Matlab 	Semester & Section:	6 th sem & 'A' sec
Github Repository:	Alvas-education-foundation/Gagan-Git		

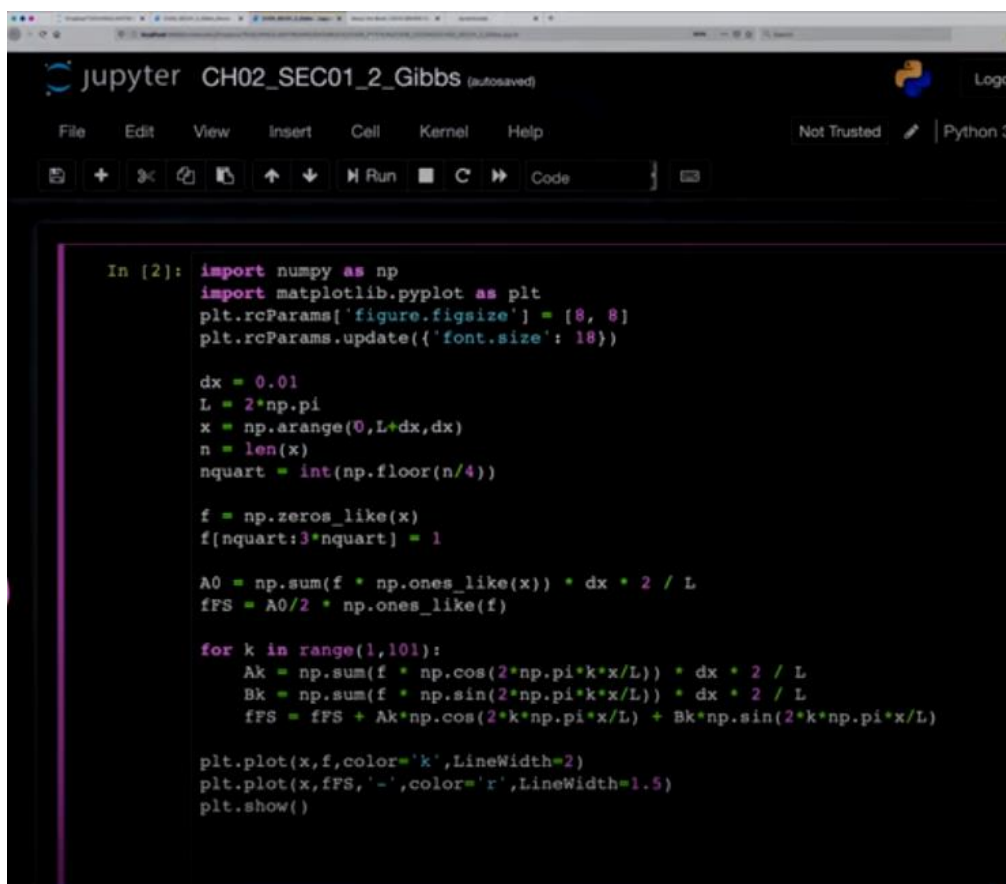
FORENOON SESSION DETAILS

Image of session



Report – Report can be typed or hand written for up to two pages.

Fourier Series & Gibbs Phenomena using Python:



```
In [2]: import numpy as np
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize'] = [8, 8]
plt.rcParams.update({'font.size': 18})

dx = 0.01
L = 2*np.pi
x = np.arange(0,L+dx,dx)
n = len(x)
nquart = int(np.floor(n/4))

f = np.zeros_like(x)
f[nquart:3*nquart] = 1

A0 = np.sum(f * np.ones_like(x)) * dx * 2 / L
fFS = A0/2 * np.ones_like(f)

for k in range(1,101):
    Ak = np.sum(f * np.cos(2*np.pi*k*x/L)) * dx * 2 / L
    Bk = np.sum(f * np.sin(2*np.pi*k*x/L)) * dx * 2 / L
    fFS = fFS + Ak*np.cos(2*k*np.pi*x/L) + Bk*np.sin(2*k*np.pi*x/L)

plt.plot(x,f,color='k',LineWidth=2)
plt.plot(x,fFS,'-',color='r',LineWidth=1.5)
plt.show()
```

Fourier Transform & Fourier Transform Derivatives:

- Digital Signal Processing/Discrete Fourier Transform. As the name implies, the Discrete Fourier Transform (DFT) is purely discrete: discrete-time data sets are converted into a discrete-frequency representation. This is in contrast to the DTFT that uses discrete time, but converts to continuous frequency.

The Fourier Series \rightarrow Fourier Transform

$$f(x) = \sum_{k=-\infty}^{\infty} C_k e^{i k \pi x / L} \quad \omega_k = \frac{k \pi}{L} = k \Delta \omega \quad \Delta \omega = \frac{\pi}{L}$$
$$C_k = \frac{1}{2\pi} \langle f(x), \psi_k \rangle = \frac{1}{2\pi} \int_{-L}^L f(x) \underbrace{e^{-i k \pi x / L}}_{\psi_k} dx$$
$$f(x) = \lim_{\substack{\Delta \omega \rightarrow 0 \\ (L \rightarrow \infty)}} \sum_{k=-\infty}^{\infty} \frac{\Delta \omega}{2\pi} \int_{-\pi/\Delta \omega}^{\pi/\Delta \omega} f(\xi) e^{-i k \Delta \omega \xi} d\xi e^{i k \Delta \omega x}$$
$$= \int_{-\infty}^{\infty} \underbrace{\frac{1}{2\pi} \int_{-\infty}^{\infty} f(\xi) e^{-i \omega \xi} d\xi}_{f(\omega)} e^{i \omega x} d\omega$$

Fourier Transform and Convolution:

- Why study Fourier transforms and convolution? Each of these sinusoidal terms has a magnitude (scale factor) and a phase (shift). – Note that in a computer, we can represent a function as an array of numbers giving the values of that function at equally spaced points.

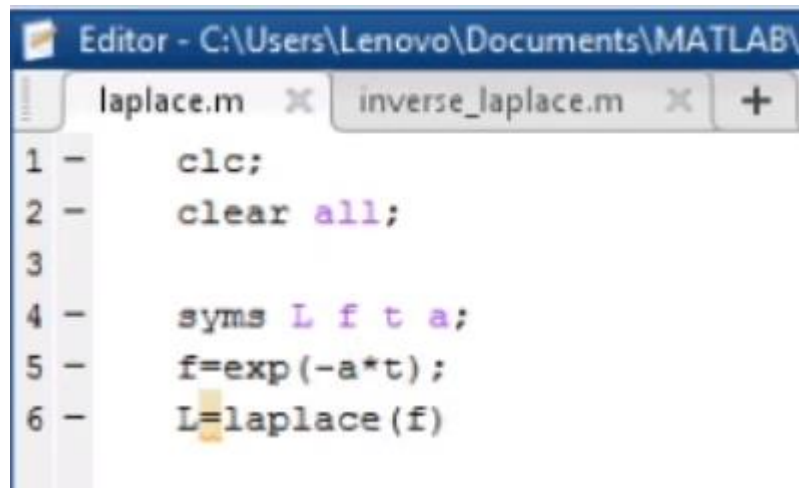
Laplace Transform of First order:

- One familiar input to a first order system is the step change or step input. A step change from 0 to 1 is equivalent to a function that is equal to 0 for time < 0, and is equal to 1 for time ≥ 0 . The Laplace transform of such a function is $1/s$.

$$\frac{\theta_o(s)}{\theta_i(s)} = \frac{\theta_o(s)}{a/s}$$
$$\Rightarrow \theta_o(s) = \frac{a}{s} \frac{K}{(1 + \tau s)} = Ka \frac{1}{s(1 + \tau s)}$$
$$\Rightarrow \theta_o(s) = Ka \frac{1/\tau}{s(1/\tau + s)} = Ka \frac{1/\tau}{s(s + 1/\tau)}$$

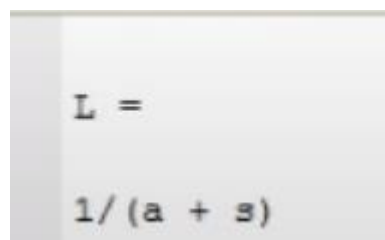
Implementation of Laplace Transform using Matlab:

Code:



```
Editor - C:\Users\Lenovo\Documents\MATLAB\I
laplace.m  X  inverse_laplace.m  X  +
1 -      clc;
2 -      clear all;
3
4 -      syms L f t a;
5 -      f=exp(-a*t);
6 -      L=laplace(f)
```

Output:

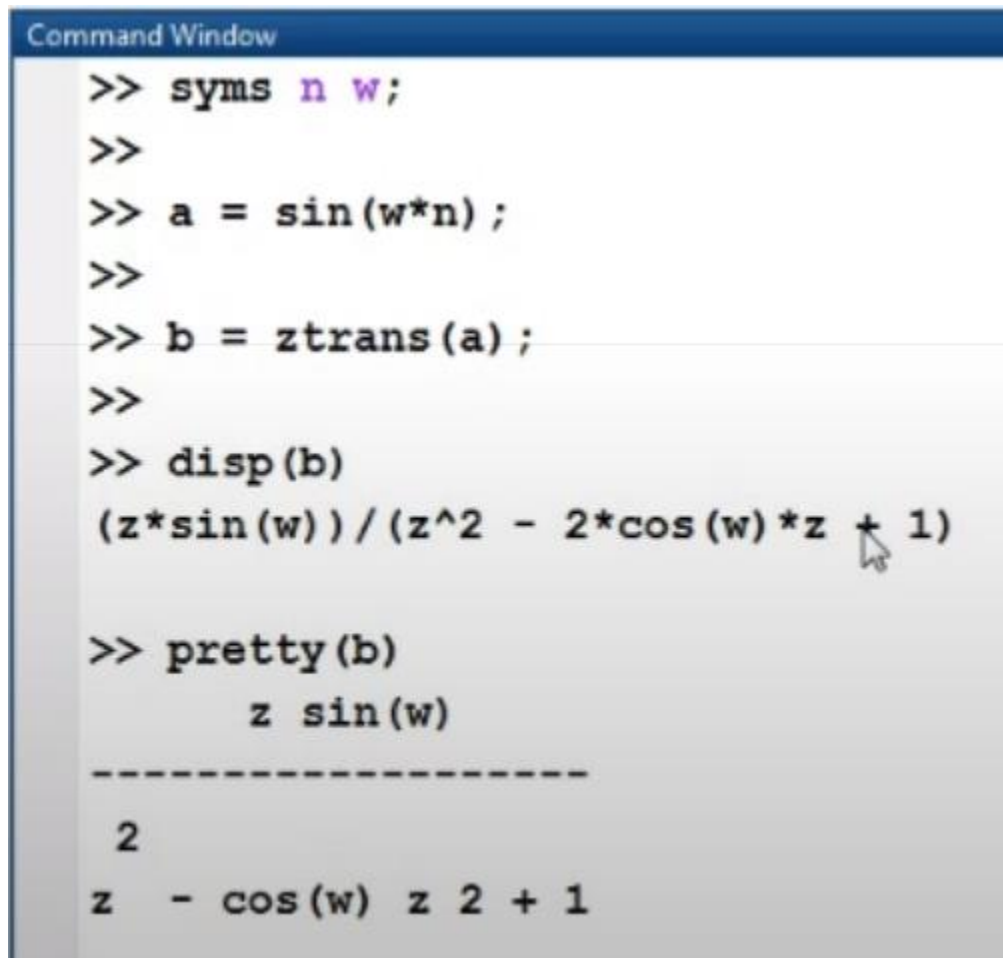


```
L =
1/(a + s)
```

Applications of Z-Transform

- Sampled systems
- Inputs and outputs are related by difference equations and Z-transform techniques are used to solve those difference equations.
- VOICE TRANSMISSION: To band-limit the signal and filter noise from the signal.
- Calculation of a signal to control a system.

Find the Z-Transform of sequence using Matlab:



```
Command Window
>> syms n w;
>>
>> a = sin(w*n);
>>
>> b = ztrans(a);
>>
>> disp(b)
(z*sin(w))/(z^2 - 2*cos(w)*z + 1)

>> pretty(b)
      z sin(w)
-----
      2
z  - cos(w) z 2 + 1
```

- The above picture is a basic example of Z-Transform using Matlab.

Date:	26 May 2020	Name:	Gagan M K
Course:	The Python Mega Course	USN:	4AL17EC032
Topic:	Application 4: Build a Personal Website with Python and Flask	Semester & Section:	6th sem & 'A' sec

AFTERNOON SESSION DETAILS

Image of session:

UdeMy | The Python Mega Course: Build 10 Real World Applications

★ Leave a rating Your progress ▾ [Share](#)

Congratulations!

Hey, I just wanted to congratulate you and tell you that it's awesome that you made it this far in the course. You have completed around 50% of the course and I know it takes patience and commitment to go this far without quitting. Since you made it this far you probably know a lot about Python by now. I promise that if you go on completing the rest of the course you will be on the right path to becoming a real Python programmer. There's a ton of fun and useful content and apps awaiting for you in the next sections.

Kudos and I'll keep in touch with you!

Amit

⚙️ ↶ ↷ 📄

Overview Q&A Bookmarks Announcements

About this course

A complete Python course for both beginners and intermediates! Master Python 3 by making 10 amazing Python apps.

Course content

- ✓ 168. Congratulations! 1min
- Section 21: Graphical User Interfaces with Tkinter 0 / 5 | 22min
- Section 22: Interacting with Databases 0 / 6 | 45min
- Section 23: Application 5: Build a Desktop Database Application 0 / 9 | 1hr 32min
- Section 24: Object Oriented Programming 0 / 8 | 1hr 15min
- Section 25: Python for Image and Video Processing with OpenCV 0 / 8 | 1hr 2min
- Section 26: Application 6: Build a Webcam Motion Detector 0 / 3 | 53min
- Section 27: Interactive Data Visualization with Bokeh 0 / 17 | 58min

Report – Report can be typed or hand written for up to two pages.

Build a Personal Website with Python and Flask:

- We have learnt to build our Personal website using Python.
- It shows how to render links from one page to another.
- It also includes HTML format for making good visuals.
- Also shows how to create virtual environment to run the app.
- This course helped in putting our website into global domain as well.
- There is scope for further improvement in the current website.
- The below shown are some images of personal website built by me.

