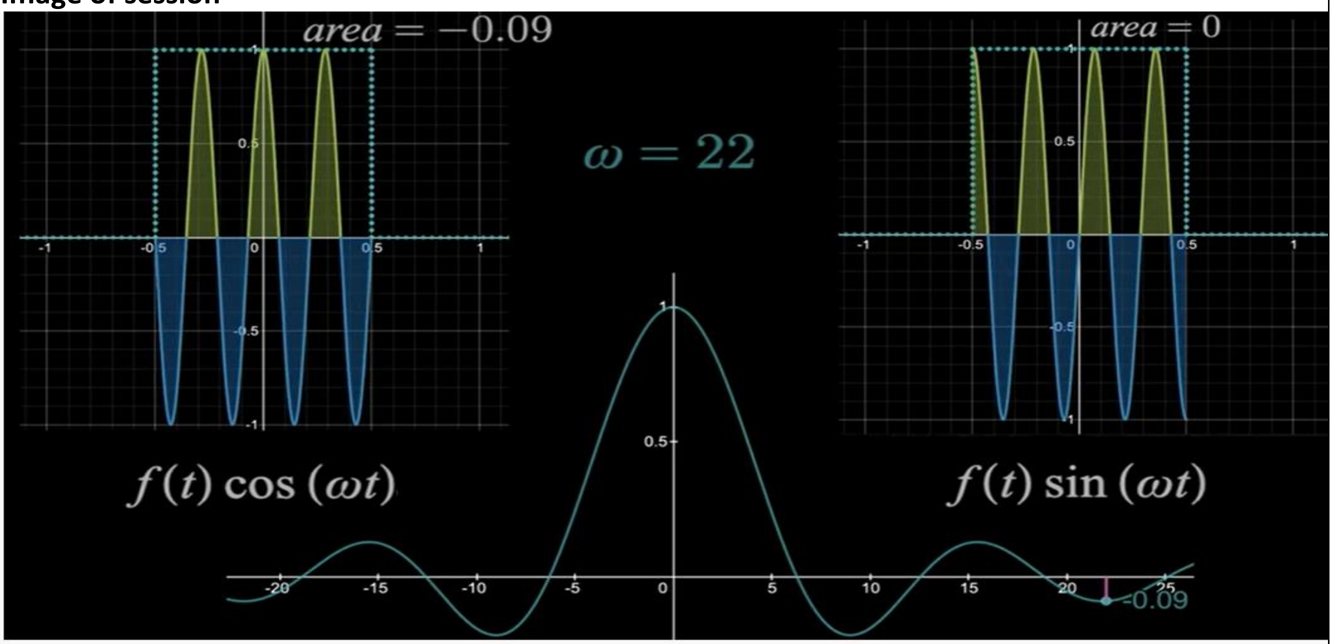
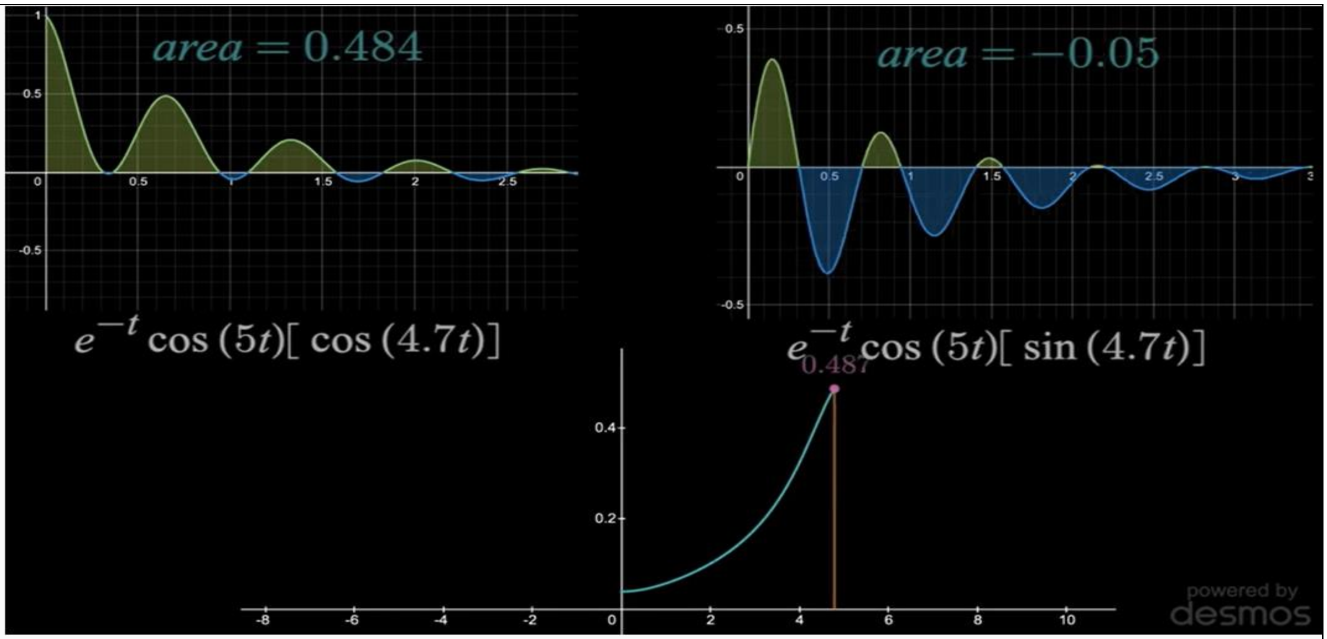
DAILY ASSESSMENT FORMAT

Date:	**25-05-2020**	**Name:**	**K B KUSHI**
Course:	**Digital Signal Processing**	**USN:**	**4AL17EC107**
Topic:	**1.Fourier Series & Gibbs Phenomena Using Python 2.Fourier Transform 3.Fourier Transform and Its Convolution and Derivatives 4.Institution of Fourier Transform and Laplace Transform 5.Laplace Transform of First Order 6. Implementation Using MATLAB, 7. Application Using Z Transform 8.Find the Z-transform of sequence Using MATLAB**	**Semester & Section:**	**6th & B**
GitHub Repository:	**https://github.com/alvas-education-foundation/KUSHI-COURSES**		

FORENOON SESSION DETAILS
Image of session



The intuition behind Fourier and Laplace transforms I was never taught in school



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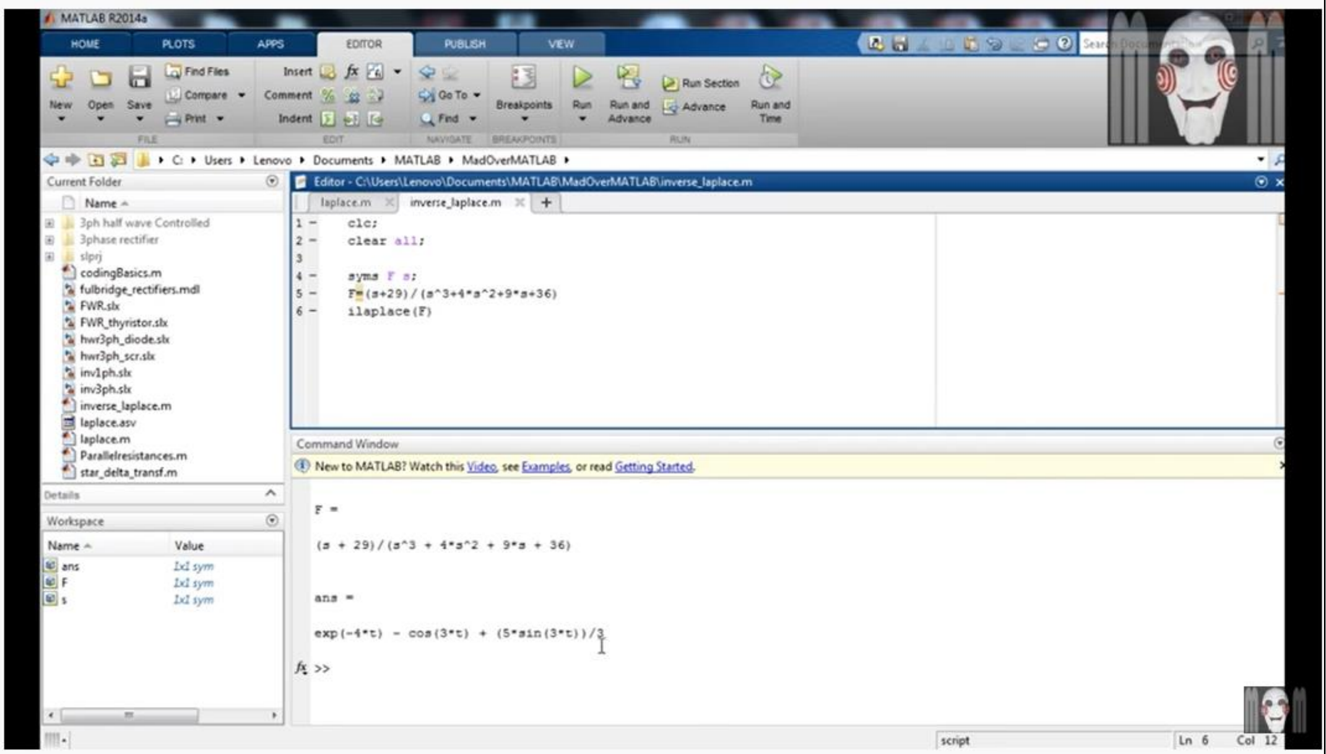

Laplace Transform and Inverse laplace Transform Using MATLAB | Mad Over Matlab Tutorials

Report:

The fourier transform

$f(x) : [-L, L] \to \mathbb{C}$.

we have Ortogonal Expansion

$$f(x) = \sum_{n=-\infty}^{\infty} C_n e^{-n\pi x/L},$$

$$C_n = 1/2L \int_{-L}^{L} f(y)\, e^{-i n\pi y/L} dy \longrightarrow (1)$$

Now lets take the limit $L \to \infty$ formally; setting $k_n = n\pi/L$ and $\Delta k = \pi/L$ and using (1), we can write as,

$$f(x) = 1/2\pi \sum_{n=-\infty}^{\infty} \left(\int_{-L}^{L} f(y)\, e^{-k_n y} dy \right) \cdot e^{i k_n y} \Delta k$$

Reimann sum for an integral on the interval $k \in (-\infty, \infty)$. Taking $n \to \infty$ is the same taking $\Delta k \to 0$, which gives

$$f(x) = 1/2\pi \int_{-\infty}^{\infty} F(k)\, e^{ikx} dk.$$

$$F(k) = \int_{-\infty}^{\infty} f(x)\, e^{-ikx} dx$$

Fourier transform Convolutions

The inverse transform of a product of functions is not the product of fourier transform, defined as.

$$(f * g)(x) = \int_{-\infty}^{\infty} f(x-y)\, g(y) dy$$

Using the defination, fourier transform of this is

$$(f*g)^\wedge = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(x-y)\, g(y) e^{-ikx} dy dx$$

Using the change of variables $z = x-y$ this becomes

$$\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(z)\, g(y) e^{-ik(y+z)} dy dz$$

$$= \left(\int_{-\infty}^{\infty} f(z) e^{-ikz} dz \right) \left(\int_{-\infty}^{\infty} g(y) e^{-iky} dy \right)$$

$$= \hat{f}(k)\, \hat{g}(k).$$

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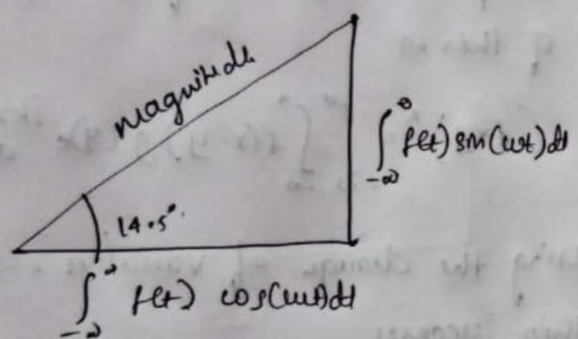
The intuition behind Fourier and Laplace transforms.

$$F(\omega) = \int_{-\infty}^{\infty} f(t)\, e^{-j\omega t}\, dt$$

$$e^{-j\omega t} = \cos(\omega t) - i\sin(\omega t)$$

$$F(\omega) = \int_{-\infty}^{\infty} f(t)\cos(\omega t)\,dt - i\int_{-\infty}^{\infty} f(t)\sin(\omega t)\,dt$$



Laplace Transform : first Order Equation

$$F(s) = \int_0^{\infty} f(t)\, e^{-st}\, dt$$

$$F(s) = \int_0^{\infty} e^{at}\, e^{-st}\, dt$$

$$= \left[\frac{e^{(a-s)t}}{a-s}\right] = \frac{1}{(s-a)}$$

$$\frac{dy}{dt} - ay = 0$$

$$\int_0^{\infty} \frac{dy}{dt}\, e^{-st}\, dt = -\int_0^{\infty} y(t)\,(-s e^{-st} dt) + [y e^{-st}]_0^{\infty}$$

$$= sY(s) - y(0)$$

Transform of dy/dt

$$sY(s) - y(0) - aY(s) = 0$$

$$Y(s) = \frac{y(0)}{s-a} \xrightarrow[\text{I.T}]{\text{Inv}} y(t) = y(0)e^{at}$$

$$\therefore \boxed{y(t) = y(0)\, e^{at}}$$

$$-aY(s) = \frac{1}{s-c} + y(0)$$

$$\boxed{Y(s) = \frac{1}{(s-c)(s-a)} + \frac{y(0)}{s-a}}$$

$$= \boxed{\frac{e^{ct} - e^{at}}{c-a}}$$

- **MATLAB software saves and reduces a lot of time in routine calculations and application for mathematicians, physicist, engineers and scientists.**
- **In this work Laplace transform are defined and applied for solving an ODE example classically, MATLAB program are used to programming Laplace transformation for initial value problem, second order ordinary differential equations with constant coefficient.**
- **MATLAB function are constructed, estimates exact solution in less than a second, which makes easy and useful for researcher, and generates the graph of exact solution.**
- **MATLAB program is possible to simulate the Laplace transformable equations directly which has made a good advancement in the research.**

Application of z-transform:

Z transform is used to convert discrete time domain signal into discrete frequency domain signal. It has wide range of applications in mathematics and digital signal processing.
It is mainly used to analyze and process digital data. For example, to analyze JPEG images, MP3 and MP4 songs, ZIP files etc., we can make use of Z transform.
Applications of Z transform in digital signal processing are,
1. Used in system designing
2.Used to find out stability of a system
3.Used to find frequency response of a signal
4.Analysis of linear discrete system
5.For designing digital filters.

MATLAB Program For Z-Transform of Finite Duration Sequence:

Program Code

```
%transform of finite duration sequence
clc;
close all;
clear all;
syms 'z';
disp ('If you input a finite duration sequence x(n), we will give you its z-transform');
nf=input ('Please input the initial value of n = ');
nl=input ('Please input the final value of n = ');
x= input ('Please input the sequence x(n)= ');
syms 'm';
syms 'y';
f (y, m) =(y*(z^(-m)));
disp ('Z-transform of the input sequence is displayed below');
k=1;
for n=nf:1:nl
    answer(k)=(f((x(k)), n));
   k=k+1;
end
disp(sum(answer));
```

Example of Output

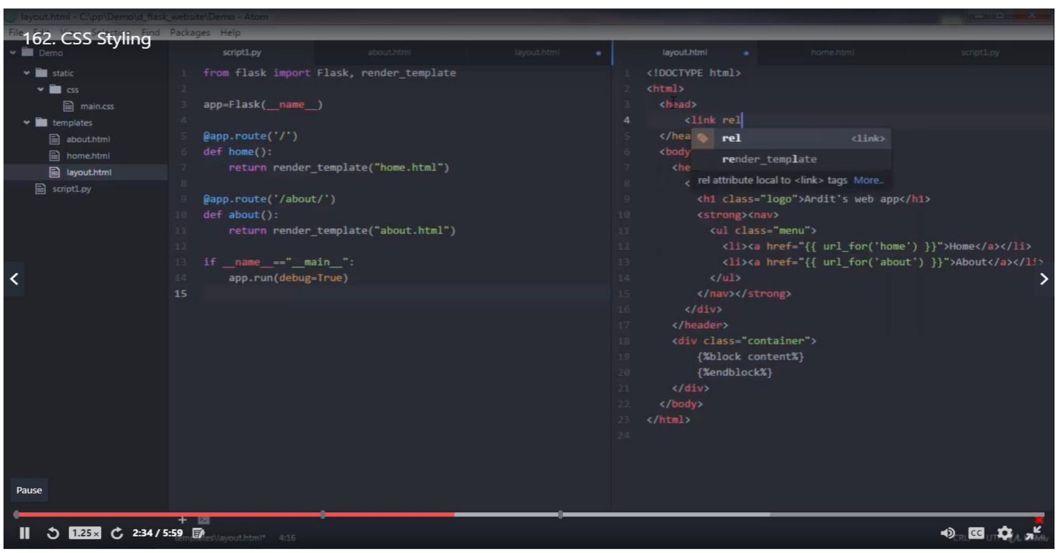
If you input a finite duration sequence x(n), we will give you its z-transform
Please input the initial value of n = 0
Please input the final value of n = 4
Please input the sequence x(n)= [1 0 3 -1 2]
Z-transform of the input sequence is displayed below:
3/z^2 - 1/z^3 + 2/z^4 + 1

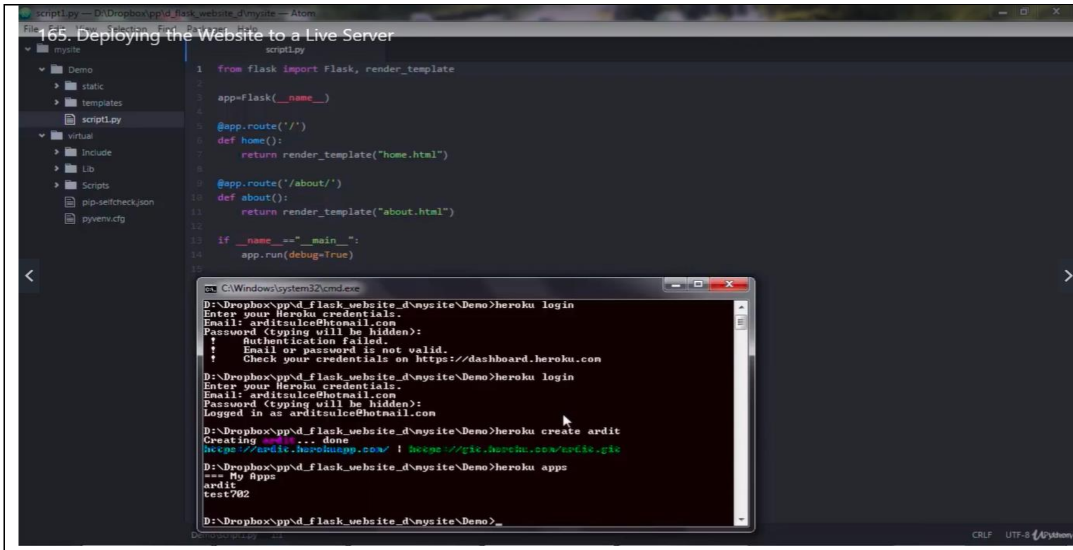
AFTERNOON SESSION DETAILS

Date:	**25-05-2020**	**Name:**	**K B KUSHI**
Course:	**Udemy-PYTHON**	**USN:**	**4AL17EC107**
Topic:	**Application 4: Build a personal website with Python and Flask**	**Semester & Section:**	**6th & B**

AFTERNOON SESSION DETAILS

Image of session:





Report –

- **HTTP is the protocol for websites. The internet uses it to interact and communicate with computers and servers.**

- **The Google Server sends back an HTTP response that contains the information that my web browser receives. Then it displays what you asked for on a page in the browser.**

- **Flask is involved because we will write code that will take care of the server. We will write code that will take care of the server.**

- **It makes the styling of the web browser much easier.**

```
from flask import Flask

app = Flask(__name__)
```

- **In our Terminal or Command Prompt go to the folder that contains your .py**
  The important part is where it says Running on http (with an IP address).

- **The Flask Framework looks for HTML files in a folder called templates. Then we add more pages inside the .html inside templates.**

- **To connect both pages we can have a navigation menu on the top. We can use Flask to make the process of creating a navigation menu easier.**

- **This allows us to not have to copy the code for the navigation menu in the two html pages.**

- **In the same way as we created a folder called templates to store all our HTML templates, we need a folder. In that folder, it is important that you should create a CSS folder to store your stylesheets.**
- **Then we are allocating the path to where the template.css is located.**
- **We use virtual environment to create an isolated environment for your Python project. This means that each project can be independent. The virtual environment needs to be created in the same directory where your app files are located.**
- **To Activate the virtual environment, go to your terminal or command prompt and using the appropriate command activate it.**
- **The next step is to install flask on your virtual environment so that we can run the application inside our environment.**
- **To deploy our web application to the cloud, we can use any Standard Environment.**

After the necessary steps are completed to launch the website, it is necessary to check for error and to troubleshoot it at times.