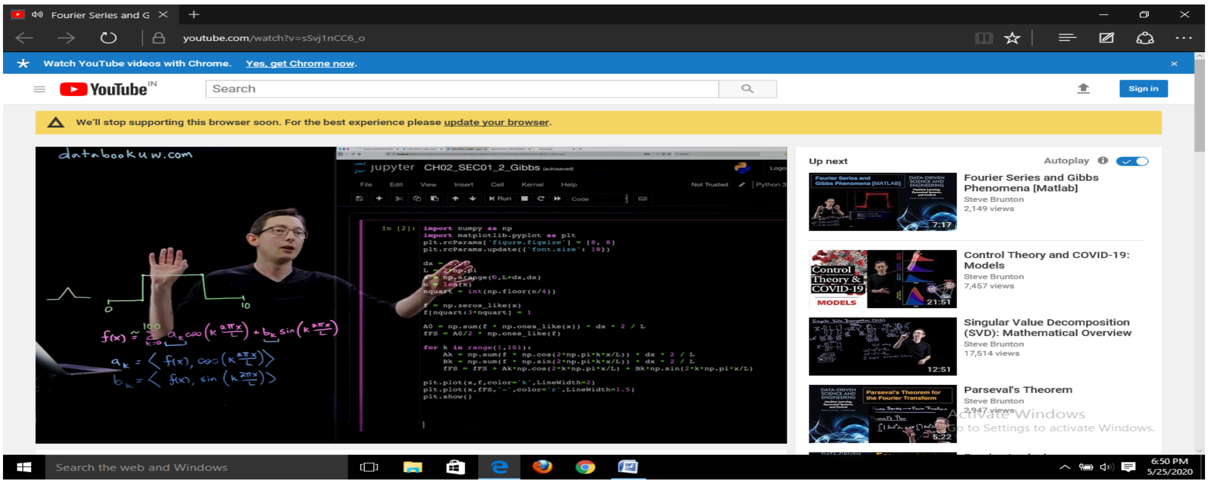
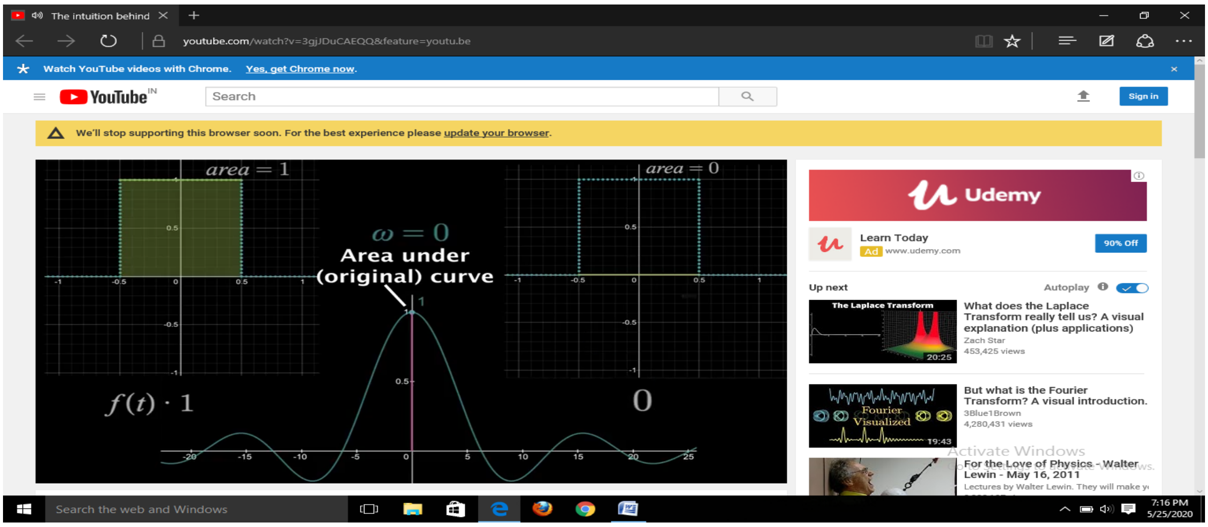
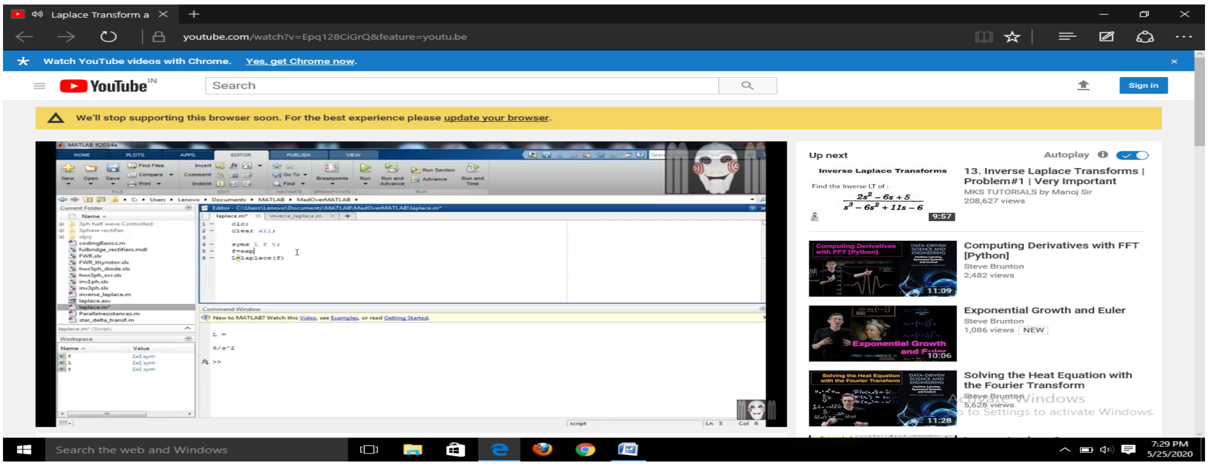
Date:	26-05-2020	Name:	Roshni A B
Course:	Digital signal processing	USN:	4AL17EC080
Topic:	Fourier Series & Gibbs Phenomena using Python, Fourier Transform, Fourier Transform Derivatives, Fourier Transform and Convolution, Intuition of Fourier Transform and Laplace Transform, Laplace Transform of First order, Implementation of Laplace Transform using Matlab, Applications of Z-Transform, Find the Z-Transform of sequence using Matlab.	Semester and section	6th sem 'B' section
Github repository:	Roshni-online		







Laplace Transform a
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Editor - C:\Users\Lenovo\Documents\MATLAB\MadOverMATLAB\laplace.m*
laplace.m*
inverse_laplace.m
clc;
clear all;
syms L f t;
f=exp
L=laplace(f)
Command Window
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L =
5/s^2
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13. Inverse Laplace Transforms | Problem#1 | Very Important
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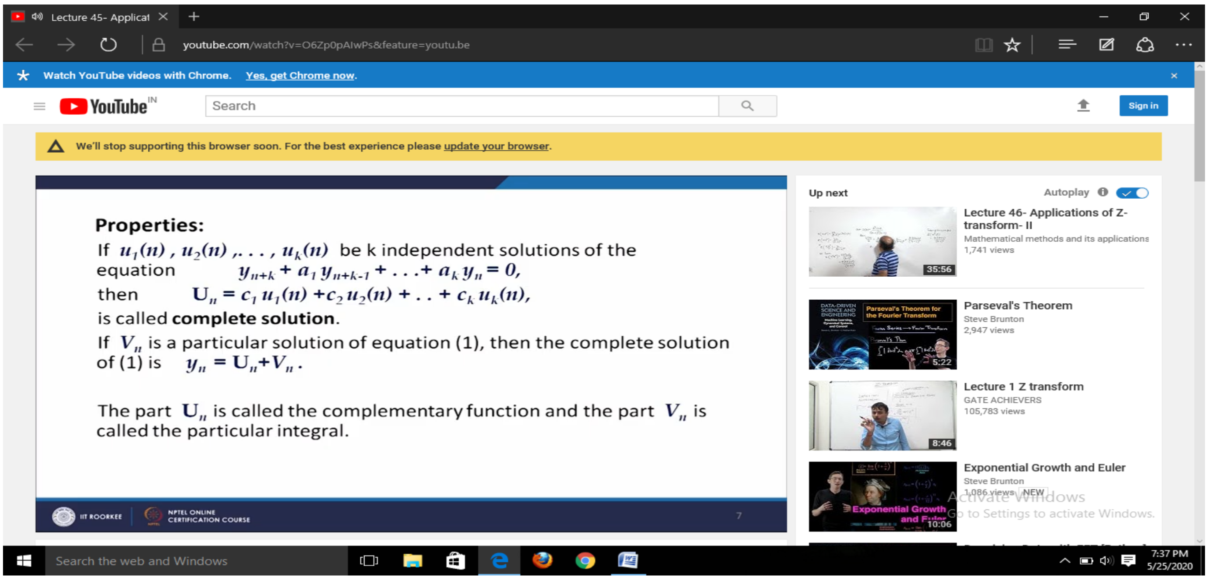

Lecture 45- Applicat
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Properties:
If $u_1(n), u_2(n), \ldots, u_k(n)$ be k independent solutions of the equation $y_{n+k} + a_1 y_{n+k-1} + \ldots + a_k y_n = 0$,
then $U_n = c_1 u_1(n) + c_2 u_2(n) + \ldots + c_k u_k(n)$,
is called complete solution.
If V_n is a particular solution of equation (1), then the complete solution of (1) is $y_n = U_n + V_n$.
The part U_n is called the complementary function and the part V_n is called the particular integral.
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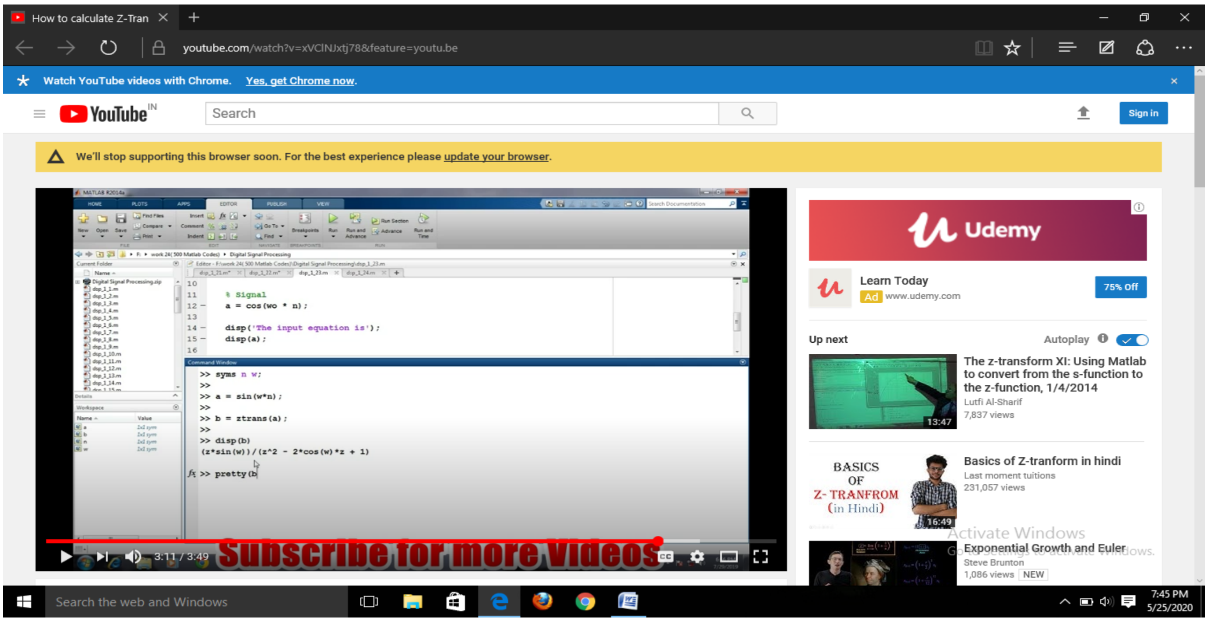
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% Signal
a = cos(wo * n);
disp('The input equation is');
disp(a);
Command Window
>> syms n w;
>>
>> a = sin(w*n);
>>
>> b = ztrans(a);
>>
>> disp(b)
(z*sin(w))/(z^2 - 2*cos(w)*z + 1)
>> pretty(b
3:11 / 3:49
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Digital signal processing

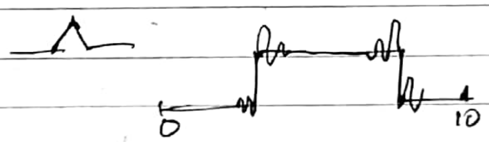
Day-2

☆ Fourier series and Gibbs Phenomena using python

$$f(x) \simeq \sum_{k=0}^{100} a_k \cos\left(\frac{k\,2\pi x}{L}\right) + b_k \sin\left(\frac{k\,2\pi x}{L}\right)$$

$$a_k = \left\langle f(x), \cos\left(\frac{k\,2\pi x}{L}\right)\right\rangle$$

$$b_k = \left\langle f(x), \sin\left(\frac{k\,2\pi x}{L}\right)\right\rangle$$

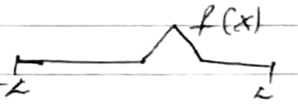


N = 1024

☆ Fourier Transform

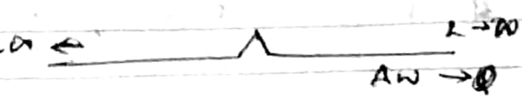
Fourier series → Fourier Transform

$$f(x) = \sum_{k=-\infty}^{\infty} c_k\, e^{ik\pi x/L}$$



$$c_k = \frac{1}{2\pi}\langle f(x), \psi_k\rangle = \frac{1}{2L}\int_{-L}^{L} \underbrace{f(x)\, e^{-ik\pi x/L}}_{\psi_k}\, dx$$

$$f(x) = \lim_{\Delta w \to 0} \sum_{k=-\infty}^{\infty} \frac{\Delta w}{2\pi} \int_{-\pi/\Delta w}^{\pi/\Delta w} f(\xi)\, e^{-ik\Delta w \xi}\, d\xi \;\; e^{-ik\Delta w x}$$



$$= \int_{-\infty}^{\infty} \frac{1}{2\pi} \int_{-\infty}^{\infty} f(\xi)\, e^{-i\omega\xi}\, d\xi\, e^{i\omega x}\, d\omega$$

$$\left\{ \begin{aligned} \hat{f}(\omega) &= F(f(x)) = \int_{-\infty}^{\infty} f(x)\, e^{-i\omega x}\, dx \\ f(x) &= F^{-1}(\hat{f}(\omega)) = \frac{1}{2\pi} \int_{-\infty}^{\infty} \hat{f}(\omega)\, e^{i\omega x}\, d\omega \end{aligned} \right\}$$

Fourier Transform pair

☆ Fourier Transform derivatives

$$F\left\{\frac{d}{dx} f(x)\right\} = \int_{-\infty}^{\infty} \underbrace{\frac{df}{dx}}_{dv} \underbrace{e^{-i\omega x}}_{u}\, dx$$

$$= \underbrace{f(x)\, e^{-i\omega x}}_{uv=0} \Big]_{-\infty}^{\infty} - \int_{-\infty}^{\infty} \underbrace{f(x)}_{v} \underbrace{(-i\omega e^{-i\omega x})}_{du}\, dx$$

$$= i\omega \int_{-\infty}^{\infty} \underbrace{f(x)\, e^{-i\omega x}\, dx}_{F[f(x)]}$$

$$= \frac{i\omega F(f(x))}{F\left(\frac{df}{dx}\right)}$$

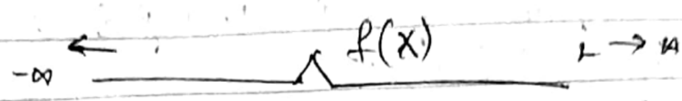
$u_{tt} = c\, u_{xx} \Longrightarrow \hat{u}_{tt} = -\omega^2 \hat{u}$

(ODE)

$$u(x,t) \xRightarrow{F} \hat{u}(\omega, t)$$

☆ Fourier Transform and convolution

$$(f*g) = \int_{a}^{\infty} f(x-\xi)\, g(\xi)\, d\xi$$



$\Delta\omega \to 0$

$$\hat{f}(\omega) = \mathcal{F}(f(x)) = \int_{-\infty}^{\infty} f(x)\, e^{-i\omega x}\, dx$$

$$f(x) = \mathcal{F}^{-1}(\hat{f}(\omega)) = \frac{1}{2\pi}\int_{-\infty}^{\infty} \hat{f}(\omega)\, e^{i\omega x}\, d\omega$$

$$\mathcal{F}(f*g) = \mathcal{F}(f)\,\mathcal{F}(g) = \hat{f}\hat{g}$$

$$\mathcal{F}^{-1}(\hat{f}\hat{g})(x) = \frac{1}{2\pi}\int_{-\infty}^{\infty} \hat{f}(\omega)\, \hat{g}(\omega)\, e^{i\omega x}\, d\omega$$

$$= \frac{1}{2\pi}\int_{-\infty}^{\infty} g(y) \underbrace{\int_{-\infty}^{\infty} \hat{f}(\omega)\, e^{i\omega(x-y)}\, d\omega\, dy}_{\int_{-\infty}^{\infty} g(y)\, f(x-y)\, dy}$$

$$= f*g$$

★ **Intuition of Fourier Transform and Laplace Transform**

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

Laplace : $F(s) = \int_{0}^{\infty} f(t)\, e^{-(a+i\omega)t}\, dt$

$$F(s) = \int_{0}^{\infty} f(t)\, e^{-i\omega t}\, e^{-at}\, dt$$

★ **Laplace Transform of First order**

Laplace Transform: 1st order equation

The transform of $f(t)$ and $y(t)$ are $F(s)$ and $Y(s)$.

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

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

$$= \left[\frac{e^{(a-s)t}}{a-s} \right]_0^{t=\infty} = \frac{1}{s-a}$$

$$\frac{dy}{dt} - ay = 0 \xrightarrow{LT} \int_0^\infty \frac{dy}{dt}\, e^{-st}\, dt$$

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

Transform of dy/dt $= sY(s) - y(0)$

$$Y(s) = \frac{y(0)}{s-a} \xrightarrow[LT]{Inverse} \boxed{y(t) = y(0)e^{at}}$$

★ Implementation of Laplace Transform using Matlab

using Software.

★ Applications of Z-Transform

$\Delta f(x) = f(x+h) - f(x)$

$\Delta y_{n+1} = y_{n+2} - y_{n+1}$

& hence

$\Delta y_{n+1} + y_n = 2$

$\Rightarrow y_{n+2} - y_{n+1} + y_n = 2$

$\Delta y_{n+1} + \Delta^2 y_{n-1} = 1$

$y_{n+2} - y_{n+1} + \Delta(\Delta y_{n-1})$

New

$\Delta y_{n-1} = y_n - y_{n-1}$

& f_0

$\Delta(\Delta y_{n-1}) = \Delta(y_n - y_{n-1})$

$= \Delta y_n - \Delta y_{n-1}$

$= y_{n+1} - y_n - (y_n - y_{n-1})$

$= y_{n+1} - 2y_n + y_{n-1}$

Linear difference equations: it is defined as an equation in which y_{n+1}, y_{n+2} --- etc occur to the first degree only and separately

If is of the form

$$y_{n+k} + a_1 y_{n+k-1} + a_2 y_{n+k-2} + \cdots + a_k y_n = f(n) \quad \text{--(1)}$$

where $a_1, a_2, \ldots a_k$ are constants

- $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$, $u_0 = 0$, $u_1 = 1$

$z(u_{n+2}) + 4z(u_{n+1}) + 3z(u_n) = z(3^n)$

$$(z^2+4z+3)\,u(z) = \frac{z}{z-3} + z = \frac{z^2-2z}{z-3}$$

Then $\frac{U(z)}{z} = \frac{(z-2)}{(z-3)(z+1)(z+3)} = \frac{A}{z-3} + \frac{B}{z+1} + \frac{C}{z+3}$

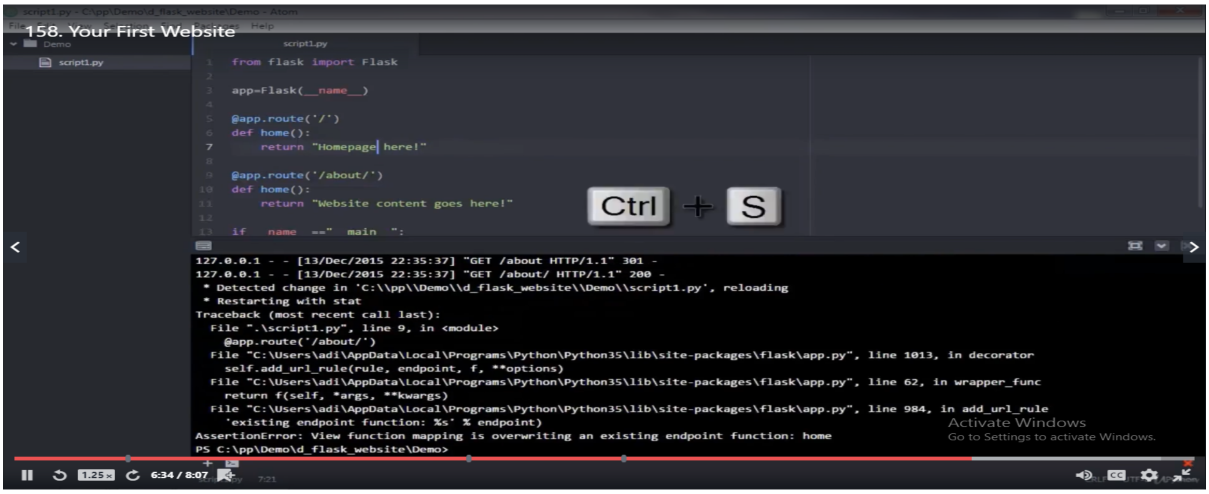
$$A = \frac{(z-2)}{(z+1)(z+3)}\Big|_{z=3} = \frac{1}{24}$$

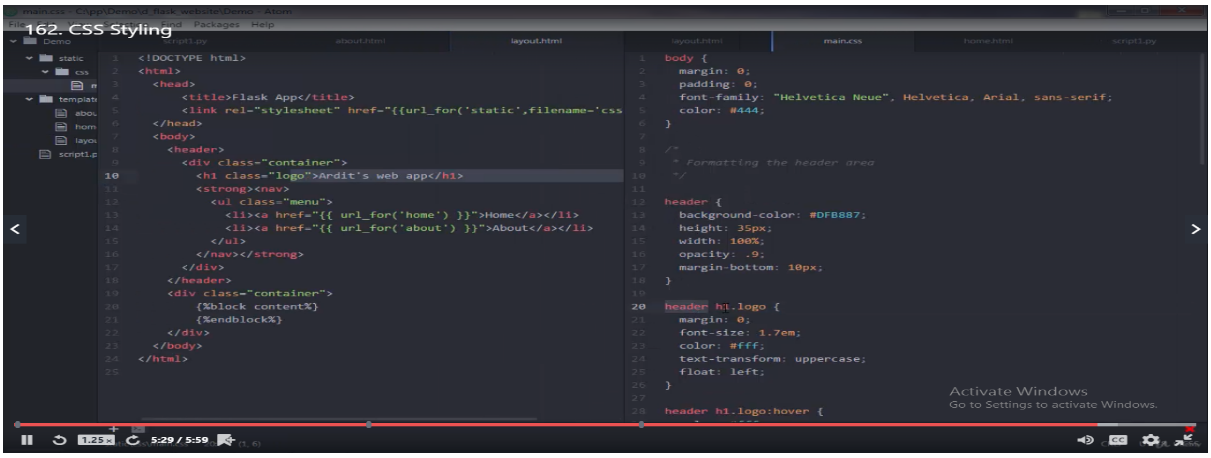
$$B = \frac{(z-2)}{(z-3)(z+3)}\Big|_{z=-1} = \frac{-3}{(-4)(2)} = \frac{3}{8}$$

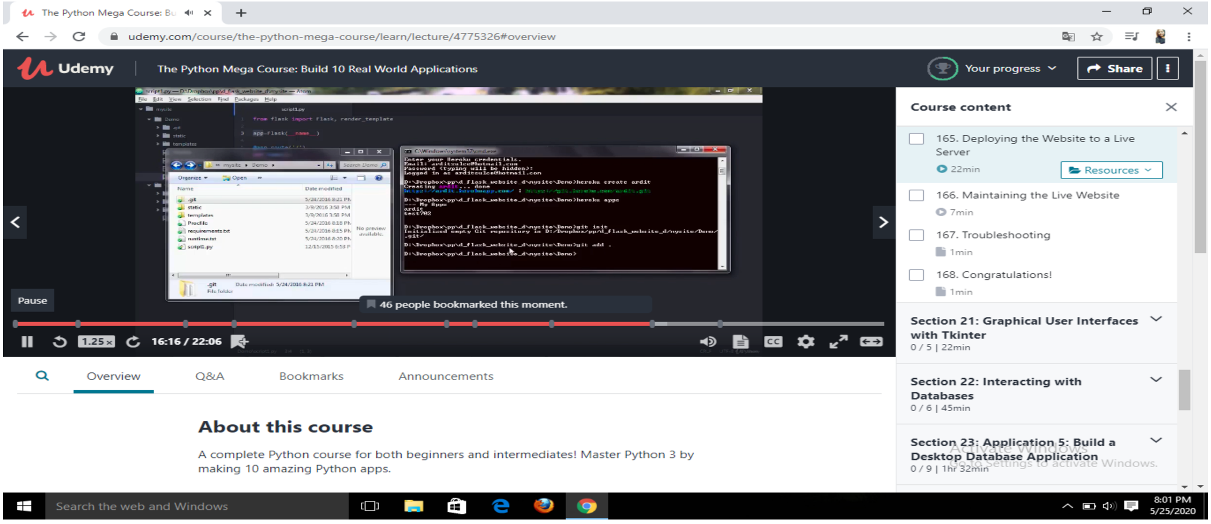
$$C = \frac{(z-2)}{(z-3)(z+1)}\Big|_{z=-3} = \frac{5}{12}$$

★ Find z transform of sequence using matlab

Date:	26-05-2020	Name:	Roshni A B
Course:	Python programming	USN:	4AL17EC080
Topic:	Application 4: Build a personal website with python and flask.	Semester and section:	6th sem and B sec







Troubleshooting

If you deployed your website on Heroku but when you visit the website on the browser you see an error, you probably did something wrong during the deployment.

No worries! You can see what you did wrong by looking at the server logs. You can access the server logs by running the following in your terminal:

```
heroku logs
```

This command will show a series of messages. Carefully read the logs to understand what went wrong. If you have trouble understanding the logs, feel free to post the logs in the Q&A.

26/05/2020
Day - 7

Application 4: Build a personal website with Python and Flask

- Personal website - How the output will look like
- Your first website
- HTML Templates
- Navigation menu
- Note on Browes caching
- How to install Git
- Deploying ~~the~~ website to a live server
- Maintaining the live website
- Troubleshooting
- ~~[illegible]~~