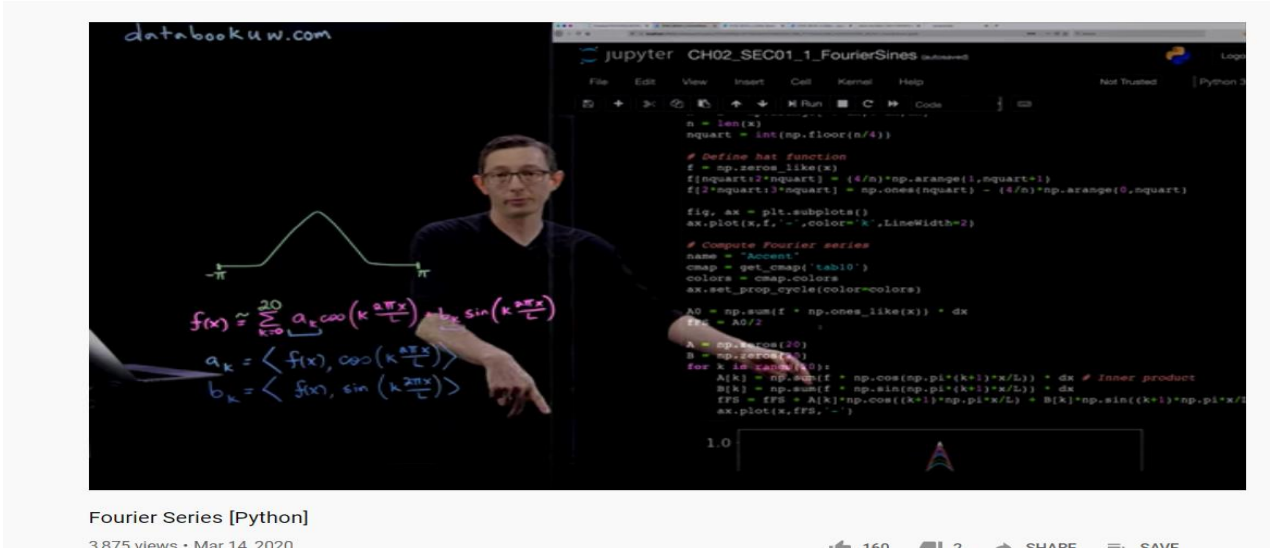
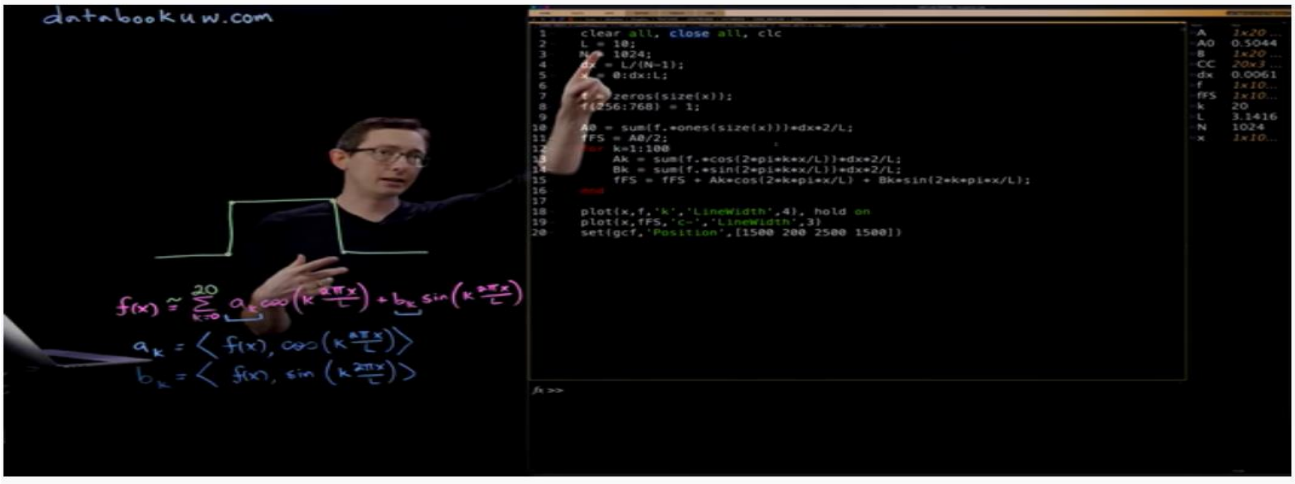
DAILY ASSESSMENT FORMAT

Date:	25 may 2020	Name:	Sushmitha R Naik
Course:	DSP	USN:	4al17ec090
Topic:	Fourier Series Part1 And Part2, Complex Fourier Series, Fourier Series Using MATLAB And Python And Gibbs Phenomena And Inner Product Hilbert Transform.	Semester & Section:	6th B
GitHub Repository:	Sushmitha_naik		

FORENOON SESSION DETAILS

Image of session





Fourier Transform

- Coordinate Transform -
  for representing images, matrices.

→ $u_t = \alpha \nabla^2 u$ – partial d.E

SVD: Data-driven FFT

- Fast fourier Transform
  - images, videos etc are compressed by FFT
  - 2D clips, audio compression

$$f(t) = \frac{1}{2}a_0 + \sum_{k=1}^{\infty}(a_k \cos 2\pi k t + b_k \sin 2\pi k t)$$

Fourier transform

$$X(F) = \int_{-\infty}^{\infty} x(t)\, e^{-j2\pi F t}\, dt$$

(08)

$$X_a(F) = \int_{-\infty}^{\infty} x(t) \cos 2\pi F t\, dt,$$

$$X_o(F) = \int_{-\infty}^{\infty} x(t) \sin 2\pi F t\, dt$$

continuous $X(F) = \int_{-\infty}^{\infty} x(t)\, e^{-j2\pi F t}\, dt$

discrete $X_k = \sum_{n=0}^{N-1} x_n \cdot e^{\frac{j2\pi kn}{N}}$

$$X_k = x_0 e^{-b_0 j} + x_1 e^{-b_1 j} + \cdots + x_n e^{-b_{N-1} j}$$

Euler's formula

$$e^{jx} = \cos x + j \sin x$$

$$X_k = x_0[\cos(-b_0) + j \sin(-b_0)] + \cdots$$

$$\boxed{X_k = A_k + B_k j}$$

$$\text{mag} = \sqrt{A_k^2 + B_k^2}$$

$$\theta = \tan^{-1}\left(\frac{B_k}{A_k}\right)$$

Summary of Chap 1

$$\langle f(x), g(x) \rangle = \int_a^b f(x)\, g(x)\, dx$$

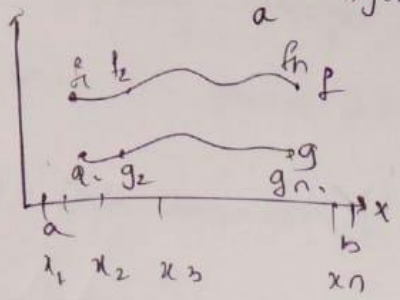
$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty}\left(A_k \cos(kx) + B_k \sin(kx)\right)$$

$$A_k = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x) \cos(kx)\, dx$$

$$B_k = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x) \sin(kx)\, dx$$

Inner product in Hilbert Spaces.

$$\langle f(x), g(x) \rangle = \int_a^b f(x)\bar{g}(x)\,dx$$



$$\Delta x = \frac{b-a}{n-1}$$

$$f = \begin{bmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{bmatrix} \qquad g = \begin{bmatrix} g_1 \\ g_2 \\ \vdots \\ g_n \end{bmatrix}$$

$$\langle f, g \rangle = g^T f = \boxed{g}\,\boxed{f}$$

$$= \sum_{k=1}^{n} f_k g_k$$

$$\boxed{\langle f, g \rangle \Delta x = \sum_{k=1}^{n} f(x_k) g(x_k) \Delta x}$$

Complex Fourier Series.

$$\langle f(x), g(x) \rangle = \int_{-\pi}^{\pi} f(x)\bar{g}(x)\,dx$$

$$f(x) = \sum_{k=-\infty}^{\infty} C_k e^{ikx}$$

$$e^{ikx} = \cos(kx) + i\sin(kx) \longrightarrow \varphi_k$$

$$= \sum_{k=-\infty}^{\infty} (\alpha_k + i\beta_k)(\cos(kx) + i\sin(kx))$$

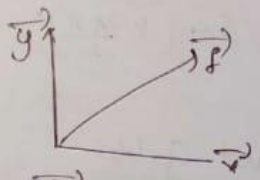
$$(C_k = \overline{C_{-k}} \text{ if } f(x) \text{ is real})$$

$$\langle \varphi_j, \varphi_k \rangle = \int_{-\pi}^{\pi} e^{ijx} e^{-ikx}\,dx$$

$$= \int_{-\pi}^{\pi} e^{i(j-k)x}\,dx$$

$$= \frac{1}{i(j-k)} \left[e^{i(j-k)x} \right]_{-\pi}^{\pi}$$

$$= \begin{cases} 0 & \text{if } j \neq k \\ 2\pi & \text{if } j = k \end{cases}$$



$$\vec{f} = \langle \vec{f}, \vec{x} \rangle \vec{x} + \langle \vec{f}, \vec{y} \rangle \vec{y}$$

$$= \frac{1}{2\pi} \sum_{k=0}^{\infty} \frac{\langle f(x), \varphi_k \rangle \varphi_k}{C_k} \qquad \varphi_k \downarrow e^{jkx}$$

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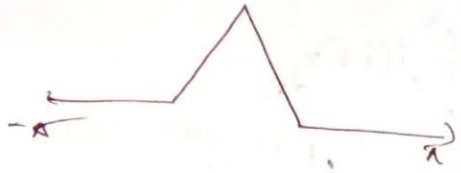
Fourier series using matlab

→ Define a domain from $-\pi$ to π

→ Define hat function.

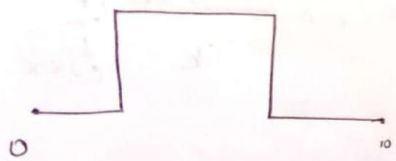


$$f(x) = \sum_{k=1}^{\infty} a_k \cos\left(k\frac{2\pi x}{L}\right) + b_k \sin\left(k\frac{2\pi x}{L}\right)$$

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

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

Fourier Series and Gibbs phenomena



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

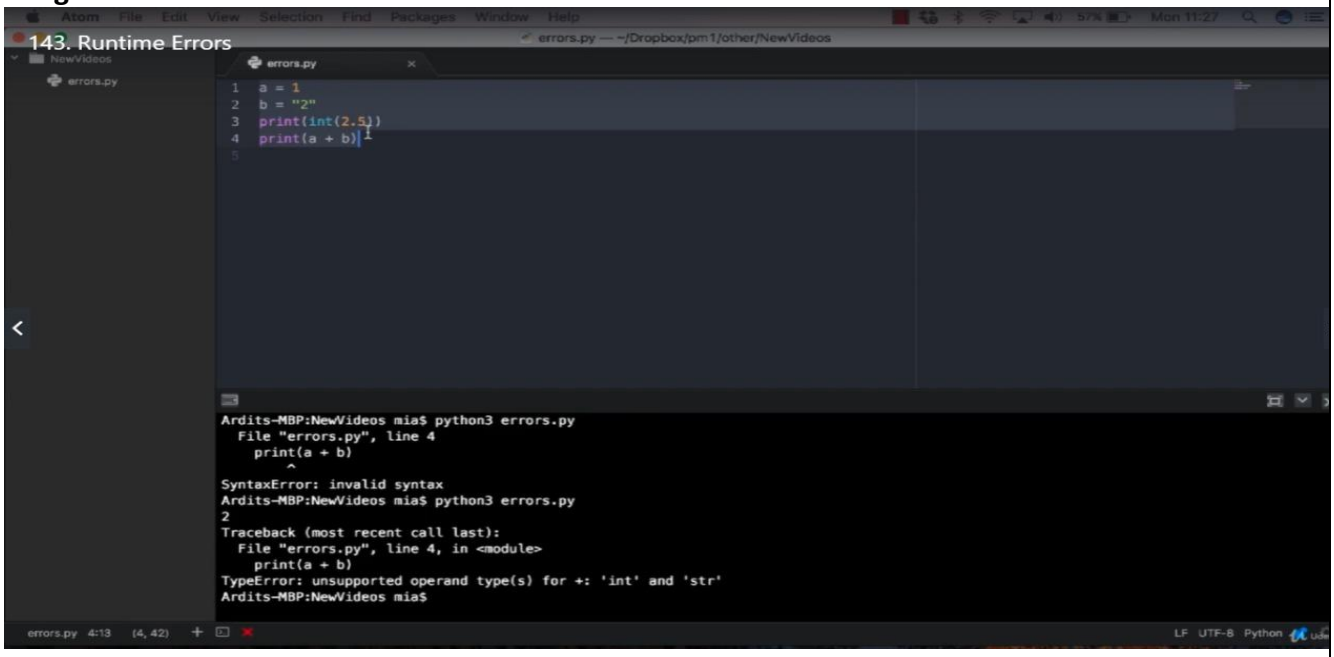
$$a_k = \langle f(x), \cos\left(k\frac{2\pi x}{L}\right)\rangle$$

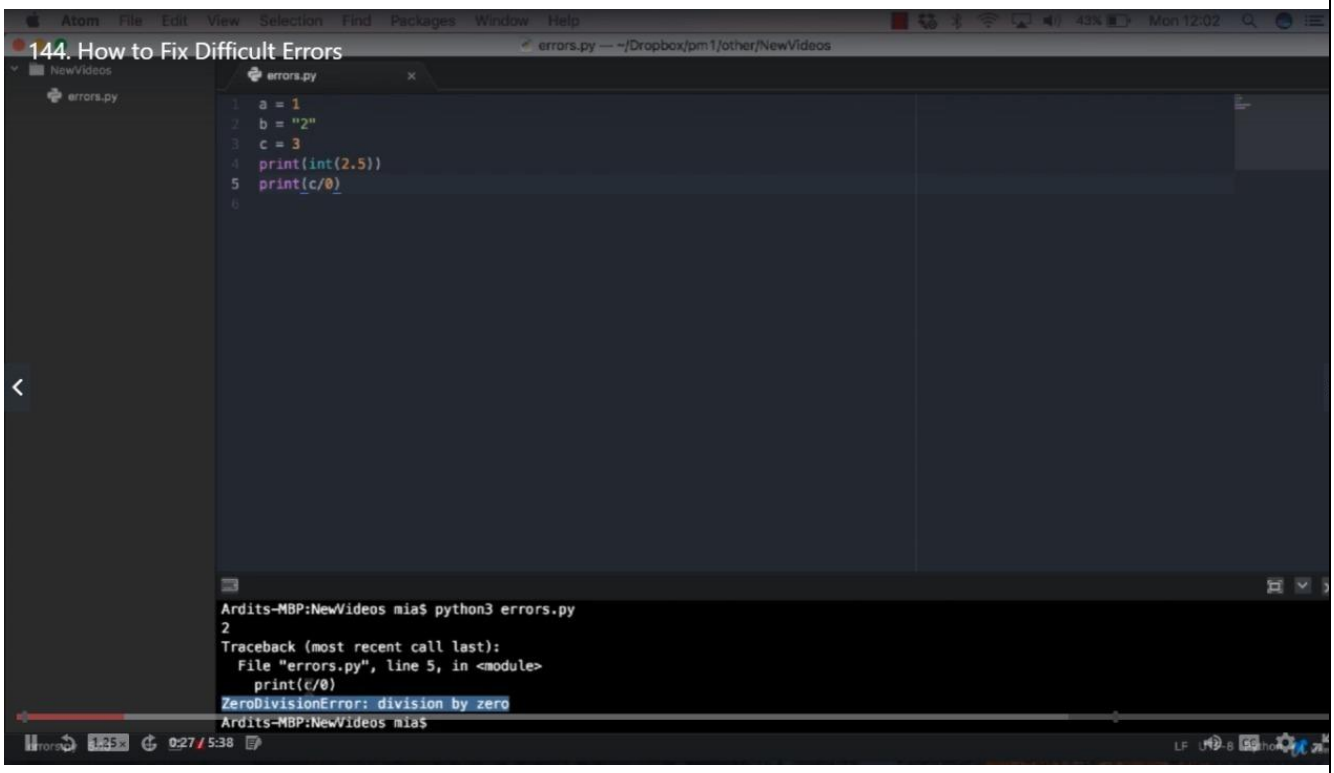
$$b_k = \langle f(x) \sin\left(k\frac{2\pi x}{L}\right)\rangle$$

Date:	25 may 2020	Name:	Sushmitha R Naik
Course:	PYTHON	USN:	4al17ec090
Topic:	1.Fixing Program Errors 2.Build A Website Blocker	Semester & Section:	6th B

AFTERNOON SESSION DETAILS

Image of session





Report –

- **Invalid syntax: for example, we need to put proper parenthesis, indentations.**
- **indicates where the error is occurring.**
- **Handling exceptions occurs between the try and except keywords has been executed.**
- **Runtime error: every other error which is not an invalid syntax error is a Runtime error. for example: divide by zero, type error, identifier error, traceback error.**
- **After this section, we learnt on how to ask proper questions on errors.**
- **To solve the runtime errors, we can copy paste the error onto the google or if the logic behind the error is known, it can solved easily by ourselves.**
- **Python website blocker is to block some certain websites which can distract the user during the specified amount of time.**
- **Every system has host file whether it is Mac, Windows or Linux.**
- **Host file in Mac and Linux: /etc./hosts**
- **Host file in Windows: C:\Windows\System32\drivers\etc**
- **Using python file handling manipulation, we will write the hostname in hosts.txt and remove the lines after our working hours.**
- **Windows user need to create a duplicate of OS's host file. Now provide the path of the duplicate file in hosts_path mentioned in the script.**
- **After the scheduling process on different operating systems, there are certain set of steps to be followed on desktop to make the website blocker work.**
- **After the settings are completed the system has to get restarted. And finally the website blocker works.**