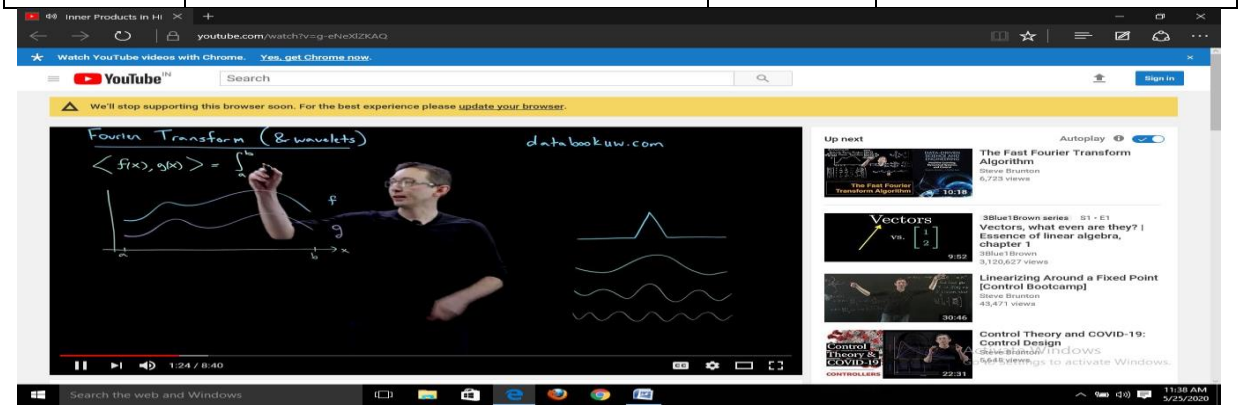
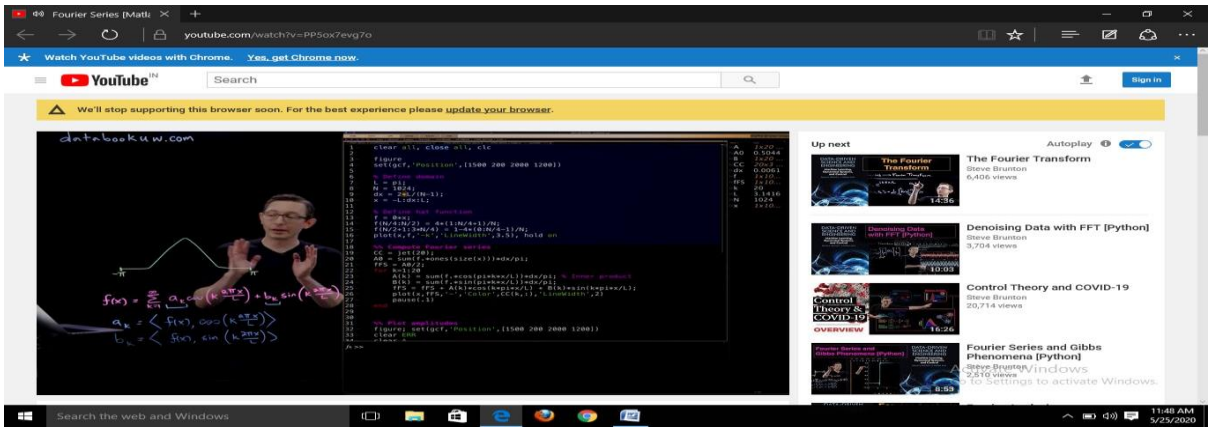
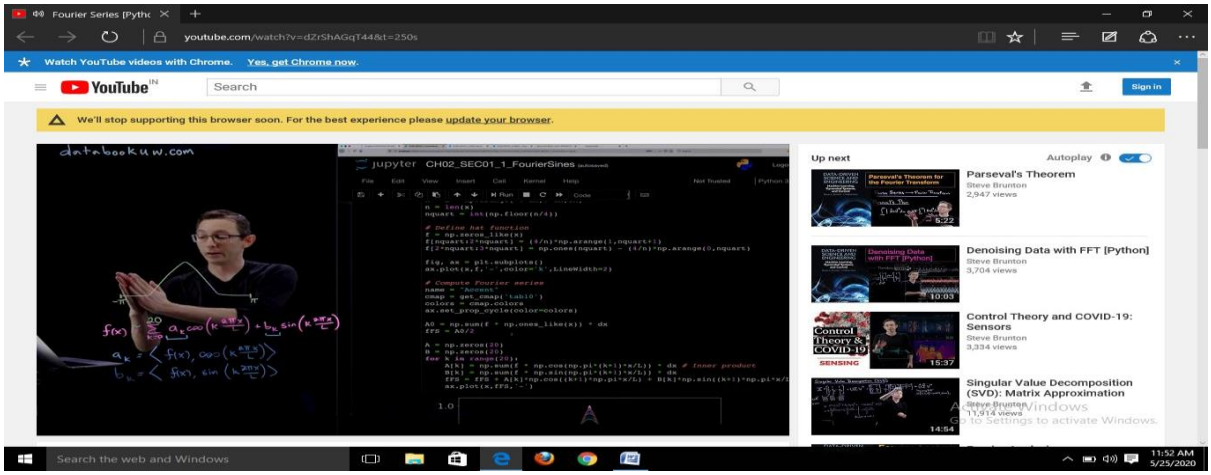
Date:	25-05-2020	Name:	Poorvi hj
Course:	Digitalsignalprocessing	USN:	4al17ec071
Topic:	Introductiontofourierseries&fourier transform,fourierseriespart-1,fourier seriespart-2,InnerProductinHilbert Transform,complexfourier,fourierseries usingmatlab,fourierseriesusingpython, fourierseries&gibbsphenomenausing matlab.	Semester and section	6thsemand'B'sec
Github repository:	Poorvi-2000		



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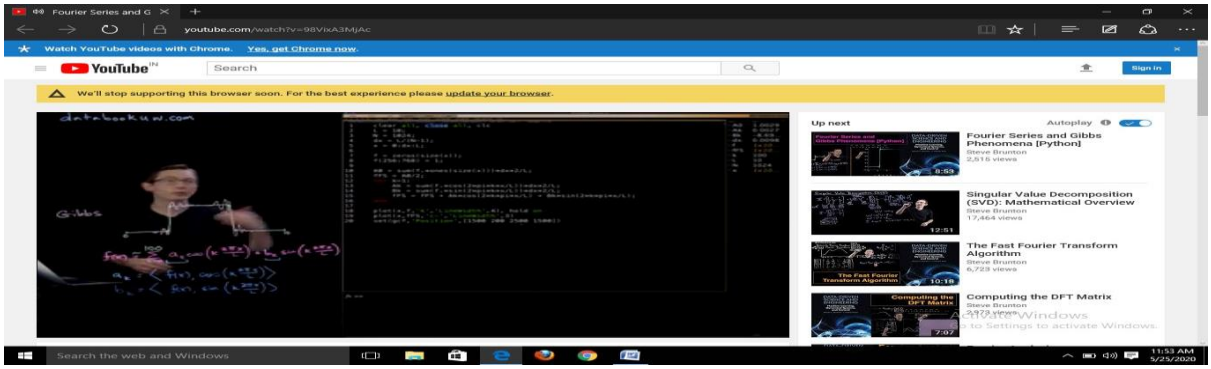
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Digital signal programming

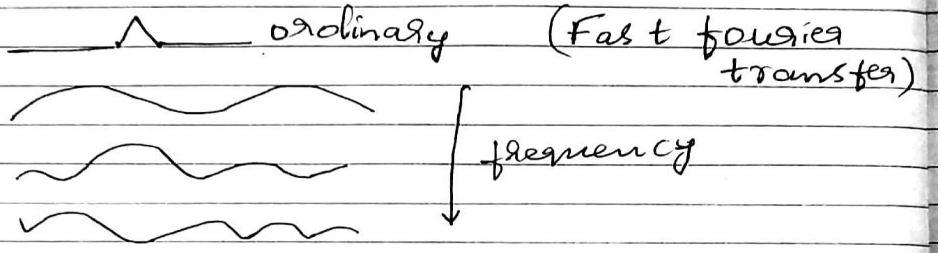
Day-1

- Fourier transfer (and Wavelet
- coordinate transform

$u(x,y,t)$

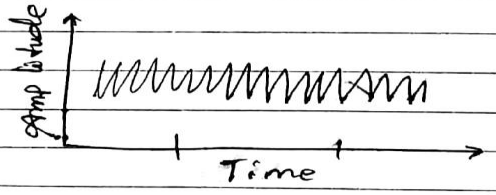
$u_t = \alpha \nabla^2 u$

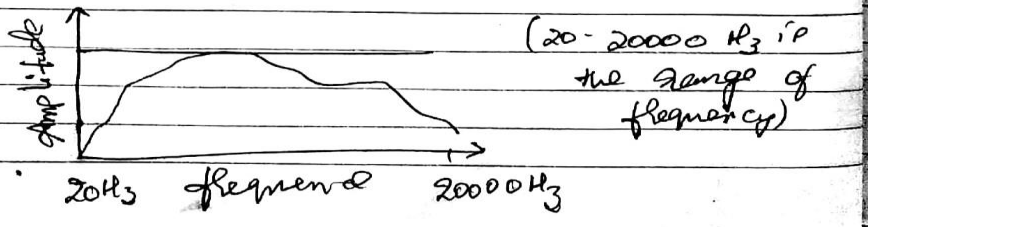
SVD = data - driven FFT



Fourier Series

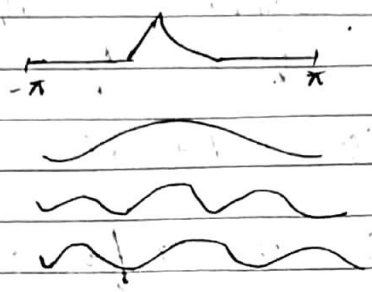
$$f(t) = \frac{1}{2} a_0 + \sum_{K=1}^{\infty} (a_K \cos 2\pi K t + b_K \sin 2\pi K t)$$





Fourier Series part-1

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



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

$$A_k = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos(kx)\, dx = \frac{1}{|\cos(kx)|^2} \langle f(x), \cos(kx) \rangle$$

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

$$= \frac{1}{|\sin(kx)|^2} \langle f(x), \sin(kx) \rangle$$

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

Fourier Series Part-2

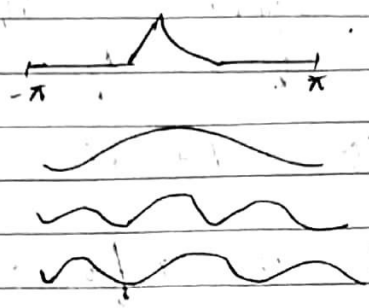
$$\langle f(x), g(x) \rangle = \int_a^b f(x)\, \bar{g}(x)\, dx$$

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

⋮

Fourier series part-1

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



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

$$A_k = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos(kx)\, dx = \frac{1}{|\cos(kx)|^2} \langle f(x), \cos(kx) \rangle$$

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

$$= \frac{1}{|\sin(kx)|^2} \langle f(x), \sin(kx) \rangle$$

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

Fourier series part-2

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

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

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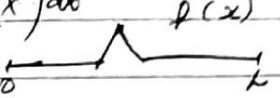
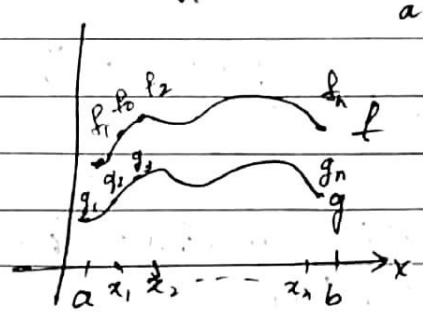
$$a_k = \frac{2}{L}\int_0^L f(x)\cos\left(\frac{2\pi k x}{L}\right)dx$$



$$b_k = \frac{2}{L}\int_0^L f(x)\sin\left(\frac{2\pi k}{L}x\right)dx$$

Inner product in Hilbert Transform

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



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

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

$$= \sum_{k=1}^{n} f_k \bar{g}_k$$

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

Complex Fourier Series

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

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

$$(c_k = \bar{c}_{-k} \quad \text{if } f(x) \text{ real})$$

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

$$\langle \psi_j, \psi_k \rangle = \int_{-\pi}^{\pi} e^{ijx} e^{-jkx} dx$$

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

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

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

$$= \frac{1}{2\pi} \sum_{k=-\infty}^{\infty} \underbrace{\langle f(x), \psi_k \rangle}_{c_k} \underbrace{\psi_k}_{e^{ikx}}$$

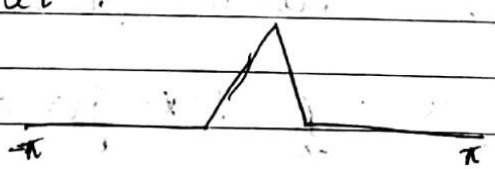
Fourier Series using matlab (use octave to execute the code)

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

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

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

output :



* Fourier Series using Python

* Fourier Series and Gibbs phenomena using matlab

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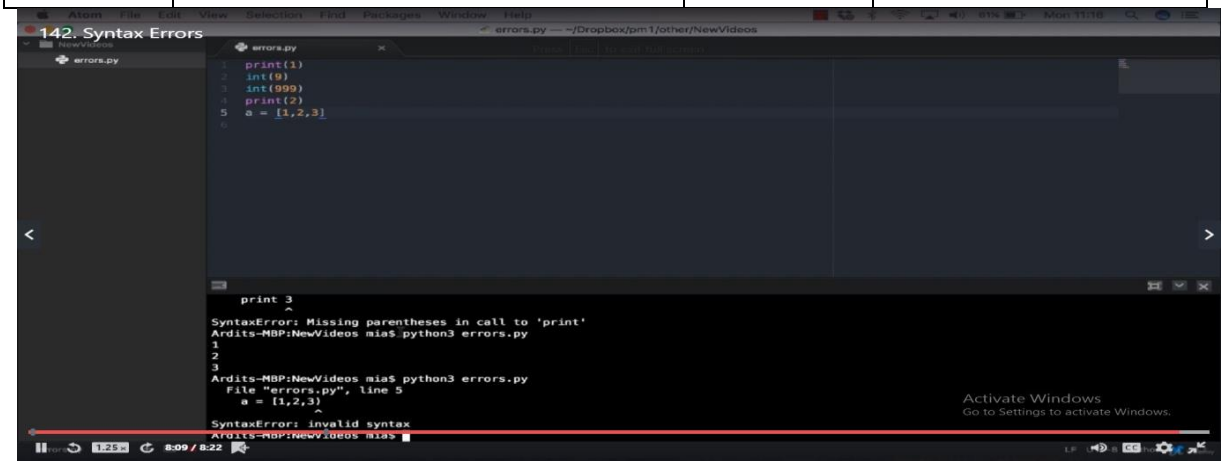
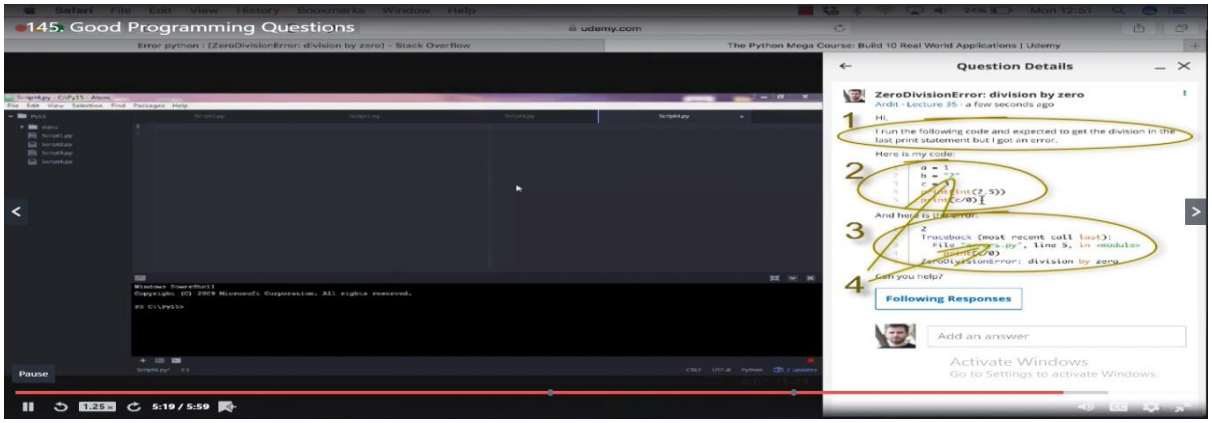
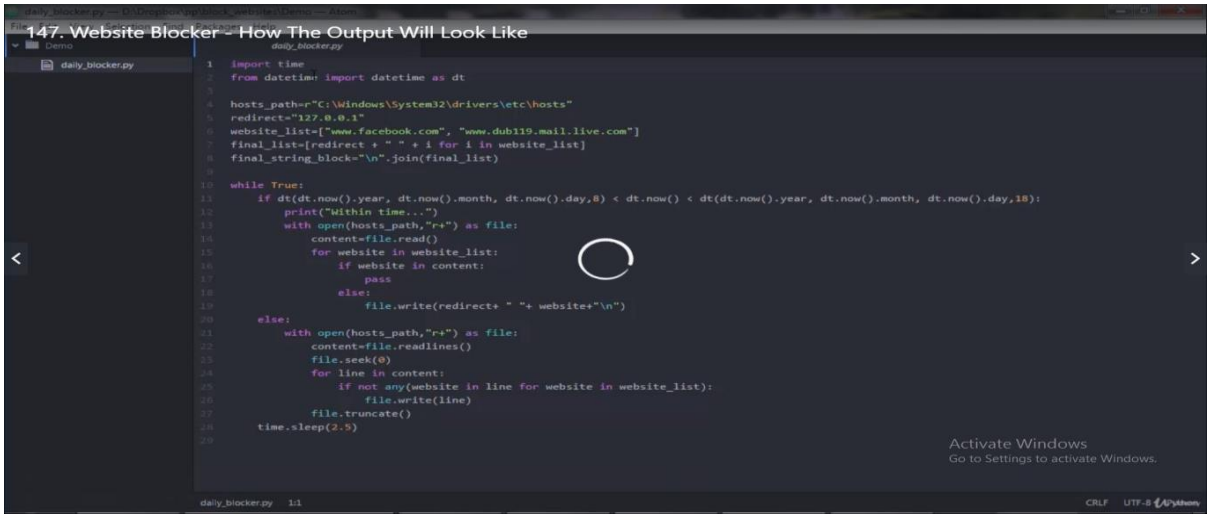
Topic:	Fixingprogrammingerrors &Application3:Buildawebsite blocker	Semester and section:	6thsemand'B'sect







video, here is another example:

```
>>> lines  = ["trees are good", "pool is fresh", "face is round"]
>>> website_list = ["face", "clock", "trend"]
>>> for line in lines:
...     any(website in line for website in website_list)
...
False
False
True
```

We start iterating over the items of `website_list` using a `for` loop. In the first iteration we would have:

`any(website in "trees are good" for website in website_list)`

Inside the parenthesis of `any()` there's another loop that iterates over `website_list`:

```
("face" in "trees are good")
("clock" in "trees are good")
("trend" in "trees are good")
```

If `any` of the above is `True` you get the expression evaluated to True. In this case none of them is True, so you get `False`.

If you want to return `True` (if all of them are `True`), use `all()` instead of `any()`.

So, the part `any(website in line for website in website_list)` will either be equal to `True` or `False`.

25/05/2020

Day-6

Fixing programming errors and Application 3: Build a website Blocker

- Fixing programming errors

* Syntax errors
* Runtime errors
* E.
* How to fix difficult Errors
* Good programming Questions
* Error Handling

- Application 3: Build a website Blocker

* website Blocker - How the output will look like
* Application architecture
* Setting up the script
* Setting up the Infinite Loop
* Implementing the first Loop
* Implementing the second part