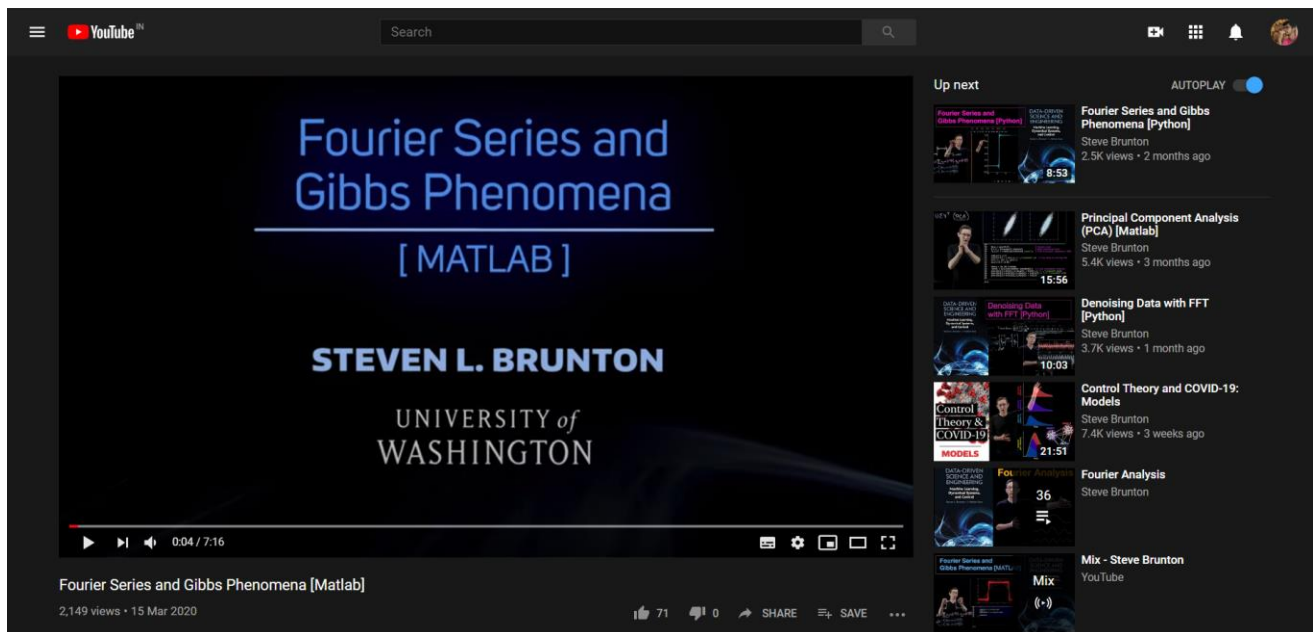


## DAILY ASSESSMENT REPORT

Date:	25 May 2020	Name:	Gagan M K
Course:	DIGITAL SIGNAL PROCESSING	USN:	4AL17EC032
Topic:	<ul style="list-style-type: none"> <li>• Introduction to Fourier Series &amp; Fourier Transform,</li> <li>• Fourier Series – Part 1,</li> <li>• Fourier Series – Part 2,</li> <li>• Inner Product in Hilbert Transform,</li> <li>• Complex Fourier Series,</li> <li>• Fourier Series using Matlab.(Use Octave to execute the code)</li> <li>• Fourier Series using python(Experience implementation using Python),</li> <li>• Fourier Series and Gibbs Phenomena Using Matlab</li> </ul>	Semester & Section:	6 <sup>th</sup> sem & 'A' sec
Github Repository:	Alvas-education-foundation/Gagan-Git		

### FORENOON SESSION DETAILS

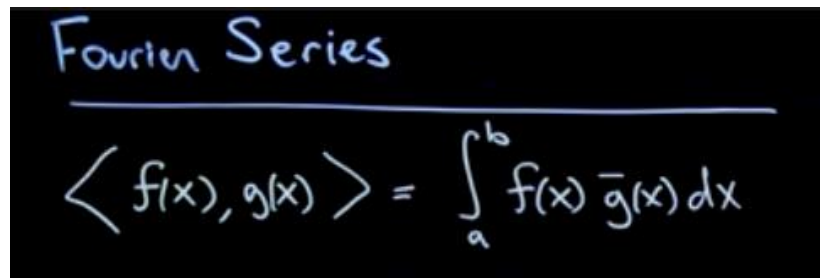
#### Image of session



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

## Introduction to Fourier Series & Fourier Transform:

### 1. Fourier series part1 & part2:



Fourier Series

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

- The Fourier Series is a specialized tool that allows for any periodic signal (subject to certain conditions) to be decomposed into an infinite sum of everlasting sinusoids.

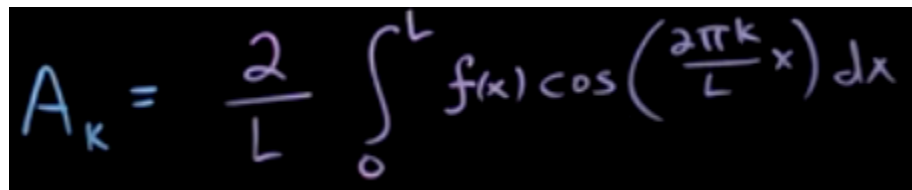
### 2. Fourier transform:

- 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.

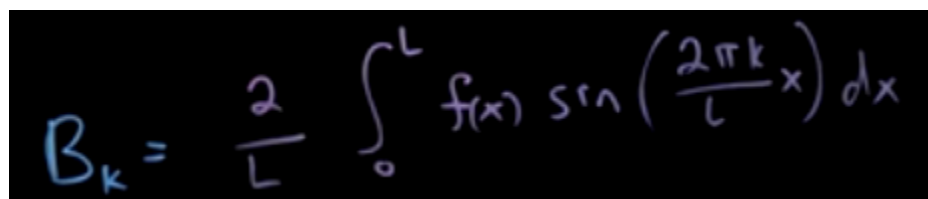

$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty} \left( A_k \cos\left(\frac{2\pi k x}{L}\right) + B_k \sin\left(\frac{2\pi k x}{L}\right) \right)$$

- Where  $f(x)$  is any function defined which contains a constant and frequently increasing elements in it.

Where:


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

And


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

### 3. Inner Product in Hilbert Transform

- The mathematical concept of a Hilbert space, named after David Hilbert, generalizes the notion of Euclidean space.
- It extends the methods of vector algebra and calculus from the two-dimensional Euclidean plane and three-dimensional space to spaces with any finite or infinite number of dimensions.
- A Hilbert space is an abstract vector space possessing the structure of an inner product that allows length and angle to be measured.

Fourier Transform (& wavelets)

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

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

$$P = \begin{bmatrix} f_0 \\ f_1 \\ f_2 \\ \vdots \\ f_n \end{bmatrix} \quad Q = \begin{bmatrix} g_0 \\ g_1 \\ g_2 \\ \vdots \\ g_n \end{bmatrix}$$

- when  $n$  goes to infinity and  $\Delta x$  goes to 0, we recover the expression.

### 4. Complex Fourier Series:

$$f(x) = \sum_{k=-\infty}^{\infty} c_k e^{ikx} = \sum_{k=-\infty}^{\infty} (\alpha_k + i\beta_k) (\cos(kx) + i\sin(kx))$$

- Where  $f(x)$  is a complex function which can be further expanded using Euler's formula as shown in above equation.
- When  $f(x)$  is complex and these are used to approximate functions.

### 5. Fourier Series using Matlab:

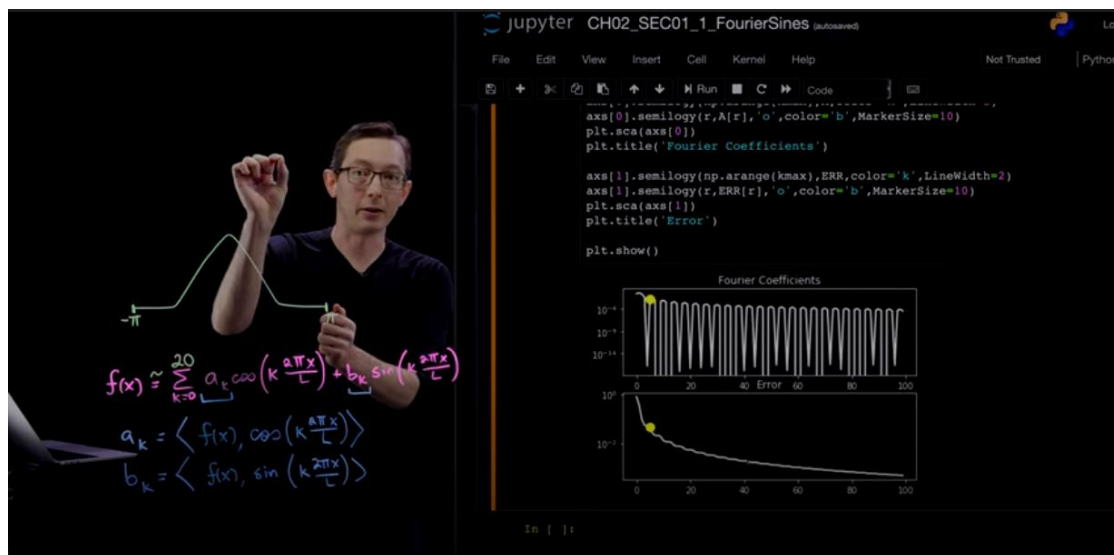
- Here we learnt that Fourier series can be done using Matlab software as shown in the below picture.

```

1 clear all, close all, clc
2
3 figure
4 set(gcf,'Position',[1500 200 2000 1200])
5
6 % Define domain
7 L = pi;
8 N = 1024;
9 dx = 2*L/(N-1);
10 x = -L:dx:L;
11
12 % Define hat function
13 f = 0*x;
14 f(N/4:N/2) = 4*(1:N/4+1)/N;
15 f(N/2+1:3*N/4) = 1-4*(0:N/4-1)/N;
16 plot(x,f,'-k','LineWidth',3.5), hold on
17
18 %% Compute Fourier series
19 CC = jet(20);
20 A0 = sum(f.*ones(size(x)))*dx/pi;
21 fFS = A0/2;
22 for k=1:20
23     A(k) = sum(f.*cos(pi*k*x/L))*dx/pi; % Inner product
24     B(k) = sum(f.*sin(pi*k*x/L))*dx/pi;
25     fFS = fFS + A(k)*cos(k*pi*x/L) + B(k)*sin(k*pi*x/L);
26     plot(x,fFS,'-', 'Color',CC(k,:), 'LineWidth',2)
27     pause(.1)
28 end
29
30
31 %% Plot amplitudes
32 figure; set(gcf,'Position',[1500 200 2000 1200])
33 clear ERR
34 clear A

```

## 6. Fourier Series using python:



## 7. Fourier Series and Gibbs Phenomena Using Matlab:

- The DC component of the signal is equal to the first Fourier series coefficient and is simply the average value of the signal over one period.
- This effect is known as Gibbs phenomenon and it manifests itself in the form of ripples of increasing frequency and closer to the transitions of the square signal.

Date:	25 May 2020	Name:	Gagan M K
Course:	The Python Mega Course	USN:	4AL17EC032
Topic:	<ul style="list-style-type: none"> <li>Fixing Programming Errors</li> <li>Application 3: Build a Website Blocker</li> </ul>	Semester & Section:	6 <sup>th</sup> sem & 'A' sec

## AFTERNOON SESSION DETAILS

Image of session:

The screenshot displays a Udemy video player interface. The main video area shows a Python code editor with the following code:

```

1 # website_blocker.py
2 import time
3 from datetime import datetime as dt
4
5 hosts_temp = "hosts"
6 hosts_path = "C:/Windows/System32/drivers/etc/hosts"
7 redirect = "127.0.0.1"
8 website_list = ["www.facebook.com", "facebook.com", "dailymail.live.com", "www.dailymail.live.com"]
9
10 while True:
11     if dt(dt.now().year, dt.now().month, dt.now().day, 10) < dt.now() < dt(dt.now().year, dt.now().month, dt.now().day, 19):
12         print("Working hours...")
13         with open(hosts_path, "a") as file:
14             content = file.read()
15             for website in website_list:
16                 if website in content:
17                     pass
18                 else:
19                     file.write(redirect + " " + website + "\n")
20     else:
21         with open(hosts_path, "r") as file:
22             content = file.readlines()
23             file.seek(0)
24             for line in content:
25                 if not any(website in line for website in website_list):
26                     file.write(line)
27             file.truncate()
28         print("Fun hours...")
29         time.sleep(5)

```

The video player interface includes a search bar, navigation tabs (Overview, Q&A, Bookmarks, Announcements), and a sidebar with the following course content list:

- 154. Scheduling the Python Program on Windows (13min)
- 155. Scheduling the Python Program on Mac and Linux (6min)
- 156. Scheduling a Python Program on a Server (1min)
- Section 20: Application 4: Build a Personal Website with Python and Flask (0 / 12 | 1hr 6min)
- 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)

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

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

### **Fixing Programming Errors:**

- **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 be solved easily by ourselves.**

### **Application 3: Building a website blocker:**

- **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
- 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. Finally, the website blocker works.