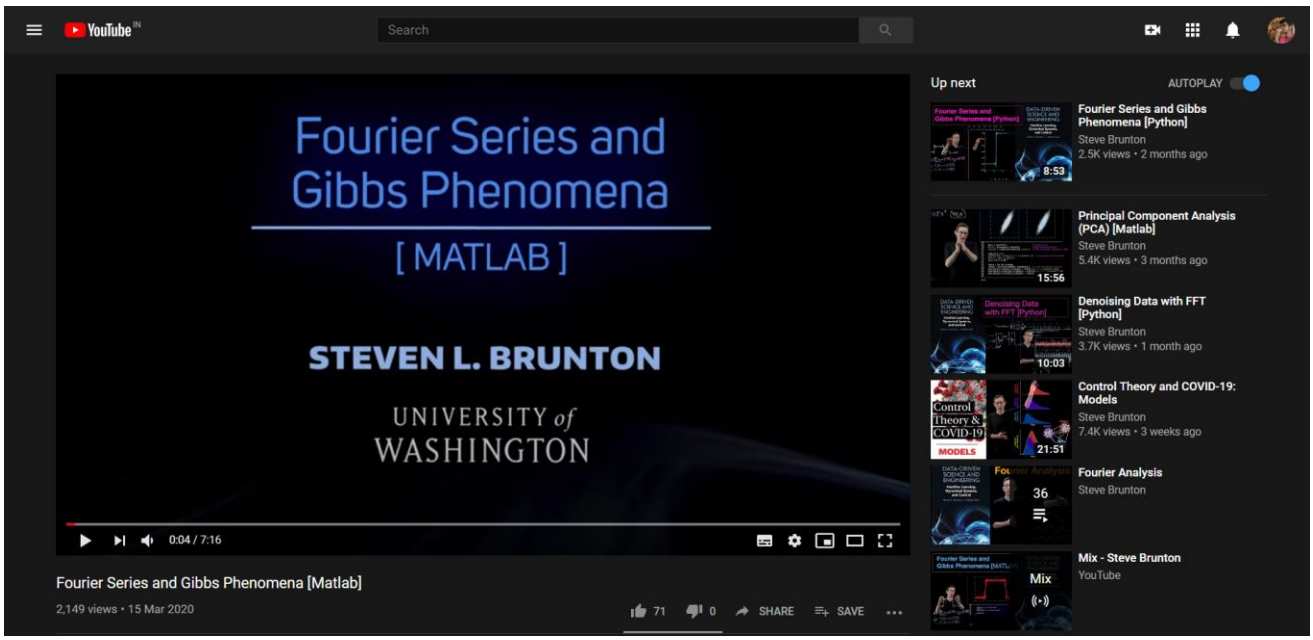
DAILY ASSESSMENT REPORT

Date:	**25 May 2020**	**Name:**	**Gagan M K**
Course:	**DIGITAL SIGNAL PROCESSING**	**USN:**	**4AL17EC032**
Topic:	• Introduction to Fourier Series & Fourier Transform, • Fourier Series – Part 1, • Fourier Series – Part 2, • Inner Product in Hilbert Transform, • Complex Fourier Series, • Fourier Series using Matlab.(Use Octave to execute the code) • Fourier Series using python(Experience implementation using Python), • Fourier Series and Gibbs Phenomena Using Matlab	**Semester & Section:**	**6th sem & 'A' sec**
Github Repository:	**Alvas-education-foundation/Gagan-Git**		

FORENOON SESSION DETAILS
Image of session



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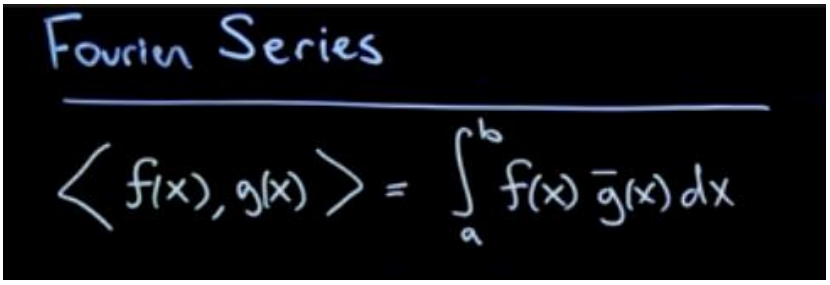
Introduction to Fourier Series & Fourier Transform:

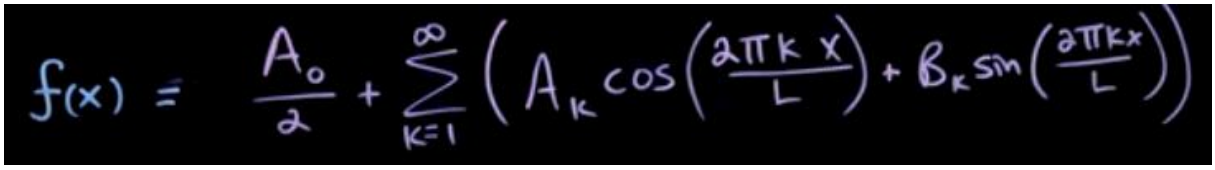
1. Fourier series part1 & part2:



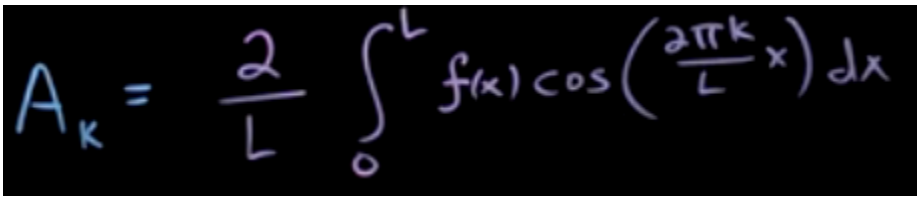
- **The Fourier Series is a specialized tool that allows for any periodic signal (subject to certain conditions) to be decomposed into an infinite sum of everlasting sinusoids.**

2. Fourier transform:

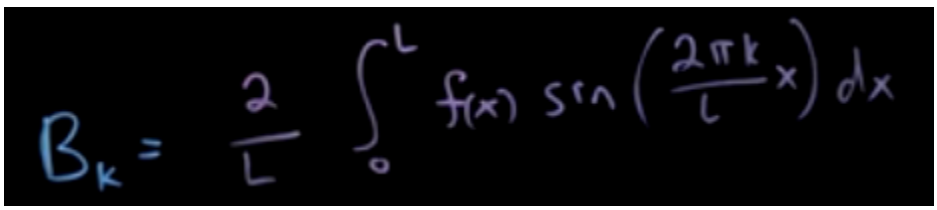
- **Digital Signal Processing/Discrete Fourier Transform. As the name implies, the Discrete Fourier Transform (DFT) is purely discrete: discrete-time data sets are converted into a discrete-frequency representation. This is in contrast to the DTFT that uses discrete time, but converts to continuous frequency.**



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

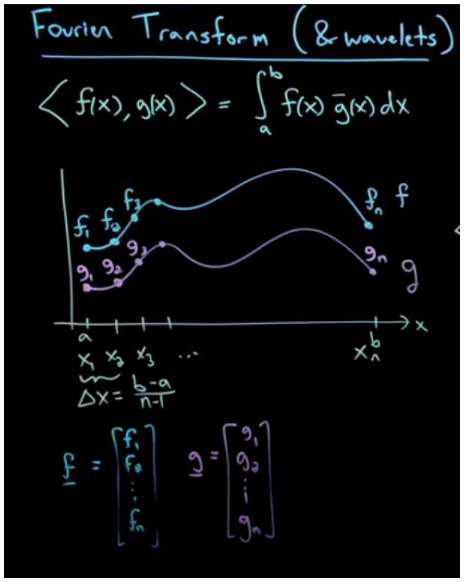


And



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.**



- **when n goes to infinity and delta x goes to 0, we recover the expression.**

4. Complex Fourier Series:

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

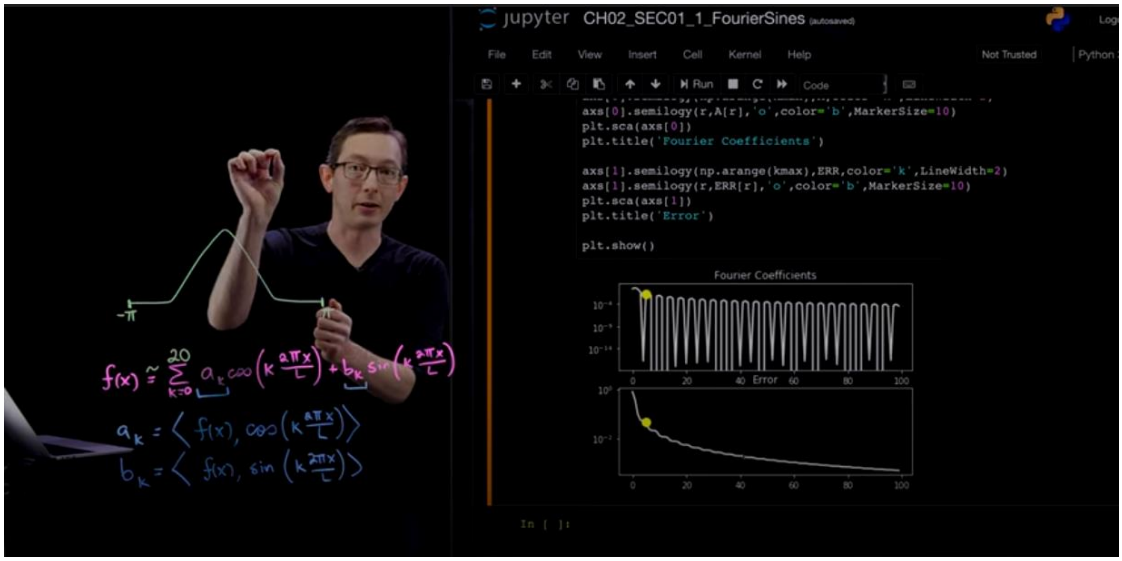
- **Where f(x) is a complex function which can be further expanded using Euler's formula as shown in above equation.**
- **When f(x) is complex and these are used to approximate functions.**

5. Fourier Series using Matlab:

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

```
clear all, close all, clc

figure
set(gcf,'Position',[1500 200 2000 1200])

% Define domain
L = pi;
N = 1024;
dx = 2*L/(N-1);
x = -L:dx:L;

% Define hat function
f = 0*x;
f(N/4:N/2) = 4*(1:N/4+1)/N;
f(N/2+1:3*N/4) = 1-4*(0:N/4-1)/N;
plot(x,f,'-k','LineWidth',3.5), hold on

%% Compute Fourier series
CC = jet(20);
A0 = sum(f.*ones(size(x)))*dx/pi;
fFS = A0/2;
for k=1:20
    A(k) = sum(f.*cos(pi*k*x/L))*dx/pi; % Inner product
    B(k) = sum(f.*sin(pi*k*x/L))*dx/pi;
    fFS = fFS + A(k)*cos(k*pi*x/L) + B(k)*sin(k*pi*x/L);
    plot(x,fFS,'-','Color',CC(k,:),'LineWidth',2)
    pause(.1)
end


%% Plot amplitudes
figure; set(gcf,'Position',[1500 200 2000 1200])
clear ERR
```

6. Fourier Series using python:



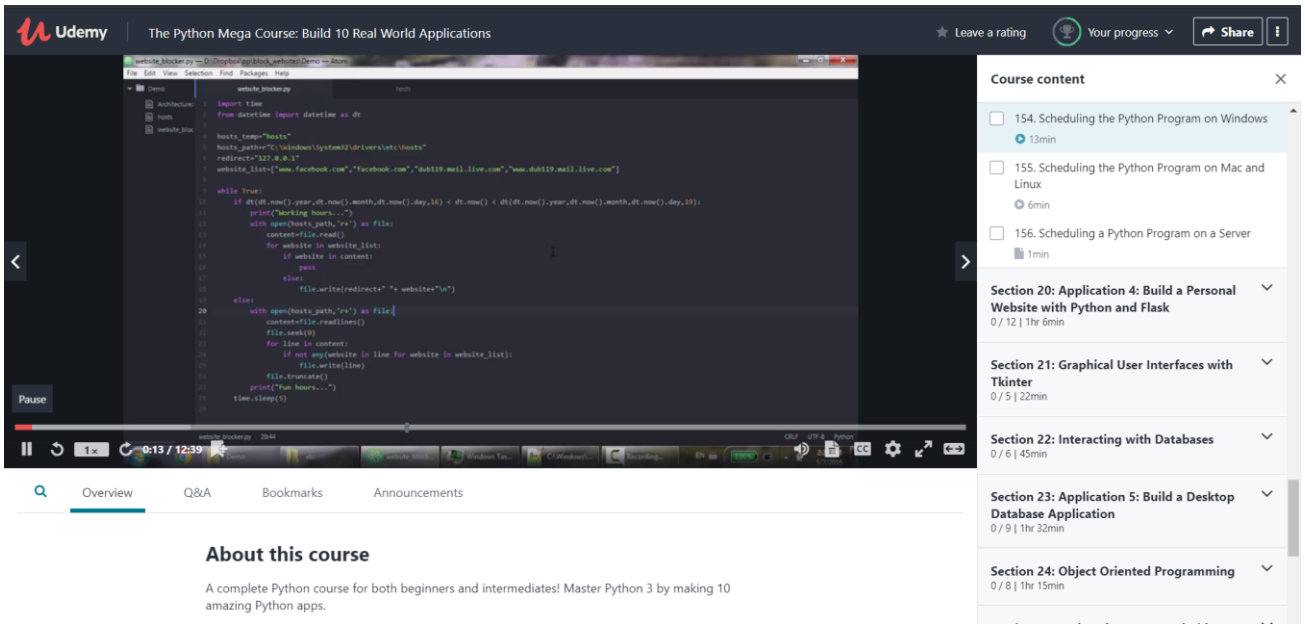
7. Fourier Series and Gibbs Phenomena Using Matlab:

- **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:	• Fixing Programming Errors • Application 3: Build a Website Blocker	Semester & Section:	6th sem & 'A' sec

AFTERNOON SESSION DETAILS

Image of session:



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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, trackback 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.**