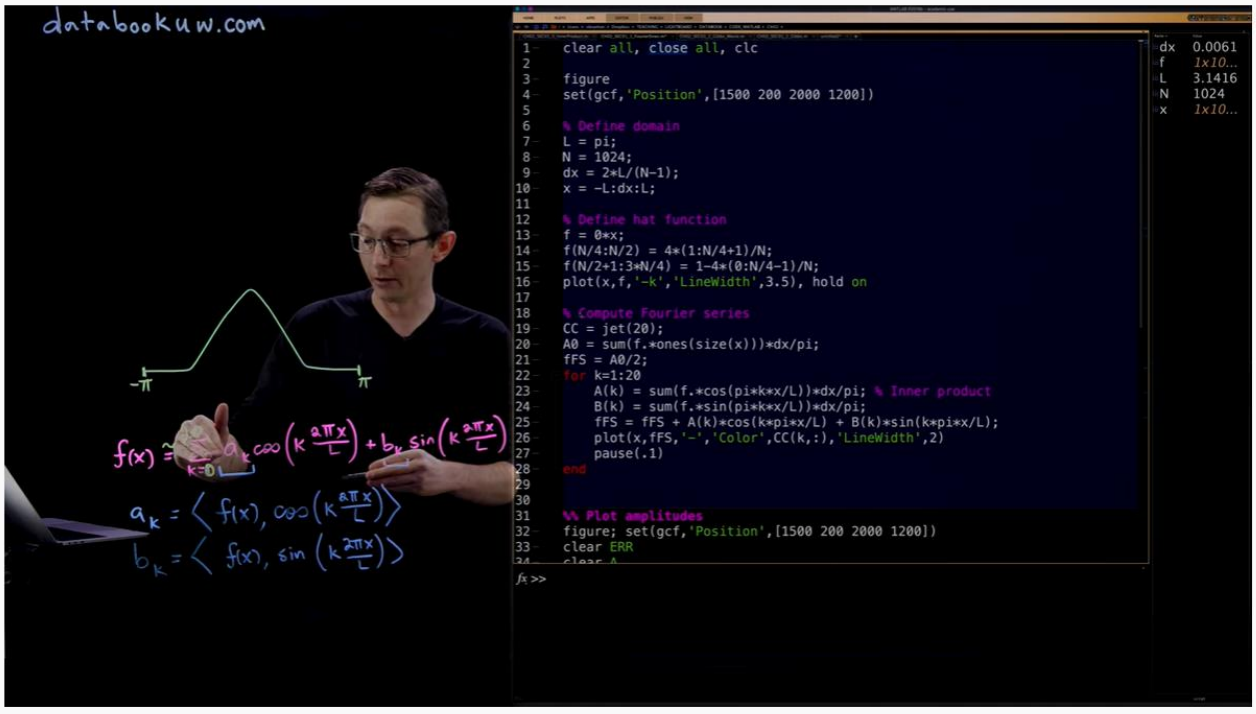
DAILY ASSESSMENT FORMAT

Date:	**25-05-2020**	**Name:**	**BINDUSHRI**
Course:	**dsp**	**USN:**	**4AL17EC011**
Topic:	**1.FOURIER TRANSFORM AND SERIES INTRODUCTION** **2.FOURIER SERIES PART 1 & 2** **3.FOURIER SERIES USING MATLAB & PYTHON** **4.FOURIER SERIES AND GIBBS PHENOMENA USING MATLAB**	**Semester & Section:**	**6th A**
Github Repository:	**Bindushri**		

FORENOON SESSION DETAILS



05-05-2020 DSP

Fourier transform :

↓

as another coordinate transform

u(x,y,t)

u(t) = a v^n u

FFT = Fast Fourier FFT

Modern FFT

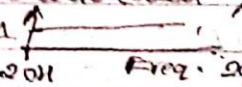
Fourier series :-

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

which takes any periodic function time.

K: frequency

* we calculate the noise signal i.e when the noise signal in time domain to frequency domain we get the straight line



* to calculate a_k & b_k (coefficients) on each particular frequency FFT is required.

: Fourier Transform

$$X(f) = \int_{-\infty}^{\infty} x(t) \overbrace{e^{-j2\pi ft}}^{\text{function}} dt \rightarrow \text{complex function.}$$

analysing function of sinusoids

↳ Result: one complex co-efficient per frequency

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

Result: two real coefficients per frequency

In order to conduct FT on discrete then we need to use DFT (Discrete Fourier transform)

continuous $X(F) = \int_{-\infty}^{\infty} x(t) e^{-j 2\pi FE} dt$

discrete $X_K = \sum_{n=0}^{N-1} x_n \cdot e^{\frac{-j 2\pi kn}{N}}$

K th frequency evaluating at n of N samples

$K/N \cong F$, $n \cong t$

$X_K = \sum_{n=0}^{N-1} x_n \cdot e^{\frac{-j 2\pi kn}{N}} \rightarrow bn$.

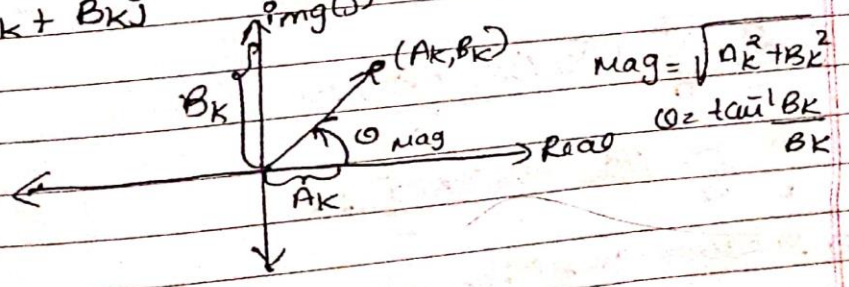
$X_K = x_0 e^{-b_0 j} + x_1 e^{-b_N j} + \cdots + x_n e^{b_{N-1} j}$

↑ nth sample value.

Euler's formula: $e^{jx} = \cos x + j \sin x$.

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

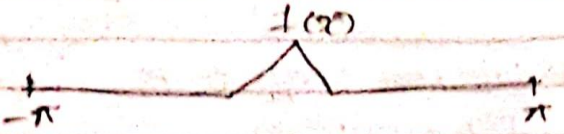
$x_K = A_K + B_K j$



$Mag = \sqrt{A_K^2 + B_K^2}$

$\theta = \tan^{-1} \frac{B_K}{B_K}$

Fourier series - part 1

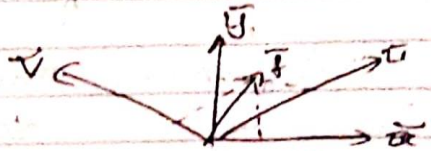


$$\langle f(x), g(x) \rangle = \int_a^b f(x)\,\overline{g}(x)\,dx.$$

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

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

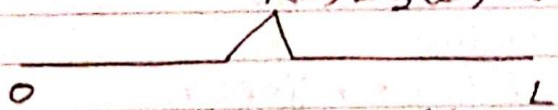
$$B_k = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x)\sin(kx)\,dx = \frac{1}{|\sin(kx)|^2} \langle f(x), \sin(kx) \rangle$$



$$f = \frac{\langle f, x \rangle}{\|x\|^2} x + \frac{\langle f, y \rangle}{\|y\|^2} y.$$

$$= \frac{\langle f, u \rangle}{\|u\|^2} u + \frac{\langle f, v \rangle}{\|v\|^2} v.$$

Part 2



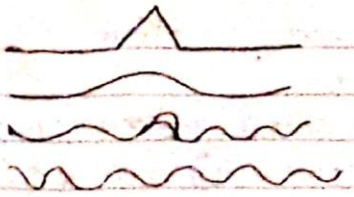
$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty} \left(A_k \cos\left(\frac{2\pi k x}{L}\right) + B_k \sin\left(\frac{2\pi k x}{L}\right) \right)$$

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

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

* Inner product on Hilbert transform

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



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

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

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

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

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

Complex fourier series $\quad e^{ikx} = \cos(kx) + i\sin(kx)$

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

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

$(c_k = \overline{c_{-k}}$ if $f(x)$ real)

→ this is orthogonal to each other

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

$\langle \psi_j, \psi_k \rangle = \int_{-\pi}^{\pi} e^{ijx} e^{-ikx}\,dx = \int_{-\pi}^{\pi} e^{i(j-k)x}\,dx = \frac{1}{i(j-k)} \left[e^{i(j-k)x} \right]_{-\pi}^{\pi} =$

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

* Fourier series using Mat-lab

```
clear all, close all, clc
figure
set(gcf, 'position', [1500 200 2000 1200])

% choose number
L = pi;
N = 1024;
dx = 2*L/(N-1);
x = -L : dx : L;
```

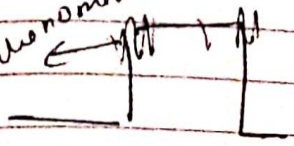
```
%define the function
L = 0.5*x;
f(N/4:N/2) = 4*(1:N/4+1)/N;
f(N/2+1:3*N/4) = 1-4*(0:N/4-1)/N;
plot(x,f,'-k','Linewidth',3-5), hold on

%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;
    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.
    %to plot authorities
    fig1, set(gcf,'Position',[1500 200 2000 1200])
    clear ERR
    clear A
    fFS = A0/2;
    A(1) = A0/2/pi,
    ERR(1) = norm(f-fFS);
    Kmax=100.;
for K=1:Kmax
    A(K+1) = sum(f.*cos(pi*K*x/L))*dx/pi;
    B(K+1) = sum(f.*sin(pi*K*x/L))*dx/pi.
    fFS = fFS + A(K+1)*cos(K*pi*x/L) +
          B(K+1)*sin(K*pi*x/L);
    ERR(K+1) = norm(f-fFS)/norm(f);
end
```

```
thresh = median(EEE) + sqrt(kmax)*4./sqrt(2);
y = max(find(EEE>thresh));
y=7;
subplot(2,1,1)
annology(0:1:kmax, A, 'k', 'LineWidth', 1.5)
hold on
```

Fourier series using Python

Its implementation using Python code.

→ Fourier series and Gibbs phenomena in matlab.



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

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

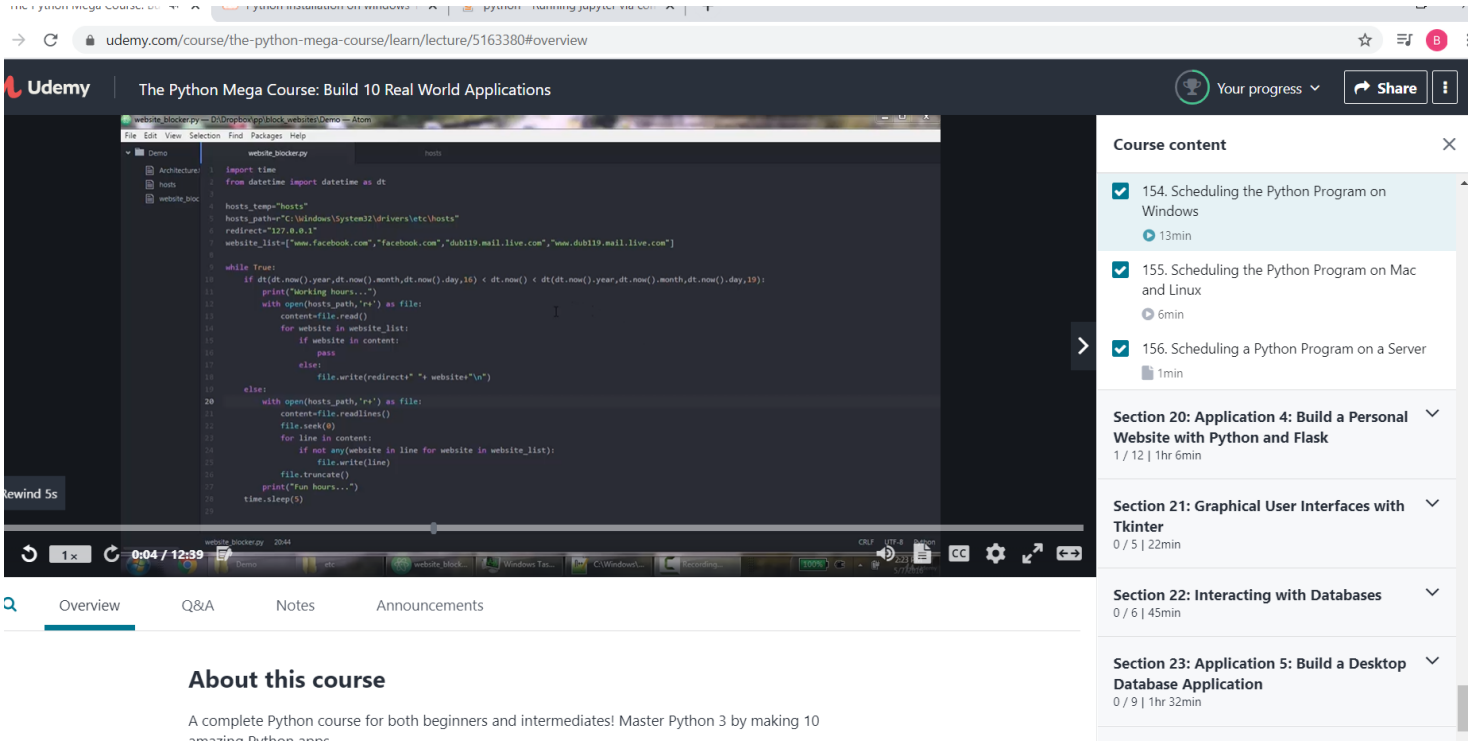
$$b_x = \left\langle f(x), \sin\left(k\frac{2\pi x}{L}\right)\right\rangle$$

Date:25may2020
Course: python
Topic:
Basics:sec18-19

Name:Bindushri
USN:4AL17EC011
Sem&Sec:6th A

AFTERNOON SESSION DETAILS

Image of session



25-05-2020

Sec 18:

Erring Errors (2 type)

1) Syntax Error 2) Exception Error.

Sec 19:- Website Blocker (Demo - daily blocker.py - automation.py)

windows: c:\windows\system32\drivers\etc (host file loc.)

→ websiteblocker.py

1. import time. (Method: when host is called)
2. host_path = r"c:\windows\system 32\drivers\etc\host"
3. redirect = "127.0.0.1"
4. website_list = ["www.facebook.com", "facebook.com", "www.dub119.mail.live.com",]
5. while True:
6. print(1)
7. time.sleep(5)

Note: to see the o/p when the command window is

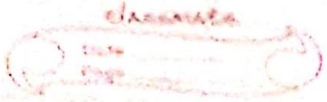
o/p 1 1 1 is printed every 5 sec.

→ Setting up the infinite loop

>>> dt.now() > dt(2016, 5, 5, 8)
True

1. import time
2. from datetime import datetime as dt
3. hosts_path = r"c:\windows\system32\drivers\etc\hosts"
4. redirect = "127.0.0.1"
5. website_list = ["www.facebook.com", "facebook.com", "dub119.mail.live.com", "www.dub119.mail.live.com"]

hosts temp = hosts



```
workingHours:
    if dt(dt.now().year, dt.now().month, dt.now().
        day, 8), < dt.now().now().year, dt.now().
        month, dt.now().day, 16):
            print("working hours")
    else:
        print("funhours...")
        time.sleep(5)
```

O/P: Funhours.... (printed every 5 sec.
Funhours....

→ Implementing first part

* paste host file in inside the folder "website_blocker.py"

~~* open~~ ~~filepath~~

```
→ path open(hosts_path, "r+") as file:
    content = file.read()
    print(content)
    else:
        print("Funhours...")
        time.sleep(5)
```

~~for~~ 2nd part

```
→ content = file.read()
    for website in website_list:
        if website in content:
            pass
        else:
            file.write(redirect + " " + website + "\n")
else:
    print("funhours...")
```

Implementing second part

```
#### 1st part is same as before.
else:
    with open(hosts_temp, 'r+') as file:
        content = file.read().rstrip()
        file.seek(0)
        for line in content:
            if not any(website in line
                for website in website_list):
                file.write(line)
    file.truncate()
    print("Few hours...")
    time.sleep(5)
```

154 => Scheduling Python program on pythonanywhere

To schedule a python script for execution on pythonanywhere.

1. https://www.pythonanywhere.com
2. Dashboard → file → upload a file, and upload the python file
3. Task → set the time of day that want your script to be executed & type in name of python file you uploaded (eg. myscript.py)
   - enter date time in UTC.
4. click — create button