

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:	6 th A
Github Repository:	Bindushri		

FORENOON SESSION DETAILS





databook.uw.com
U

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

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

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

```

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*xx;
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(0.1)
28 end
29
30 % Plot amplitudes
31 figure; set(gcf,'Position',[1500 200 2000 1200])
32 clear ERR
33 clear A
34
fx>>

```

dx	0.0061
f	1x10...
L	3.1416
N	1024
x	1x10...

Fourier Series [Matlab]

3,341 views • Mar 14, 2020

👍 113 💬 2 ➦ SHARE 📌 SAVE ...

05-05-2020 DCP

Fourier transform:

↓
is another coordinate transform

$$u(x,y)$$

$$u_1 = \mathcal{F}\{u\}$$

SVD = DHA = discrete FFT

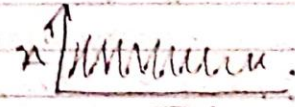
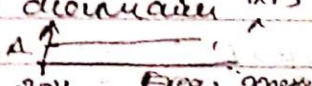
Fourier series

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 in time.

k : frequency

* to calculate the
when the noise signal is $x(t)$ 
when we calculate noise signal in time
domain to frequency domain \xrightarrow{FT} we get
the strength line 

* to calculate a_k & b_k (coefficients) in each
particular frequency FT is required.

Fourier Transform

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

analysing function
SPUSUWDS

Result: one complex
co-efficient per frequency



$$X_a(F) = \int_{-\infty}^{\infty} x(t) e^{j2\pi F t} dt \quad X_b(F) = \int_{-\infty}^{\infty} x(t) \sin 2\pi F t dt$$

Result: two real coefficients
per frequency

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

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

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

k th frequency evaluating at n of N
samples

$$k/N \cong F, \quad n \cong t$$

$$X_k = \sum_{n=0}^{N-1} x_n \cdot e^{-j2\pi kn/N} \rightarrow b_n$$

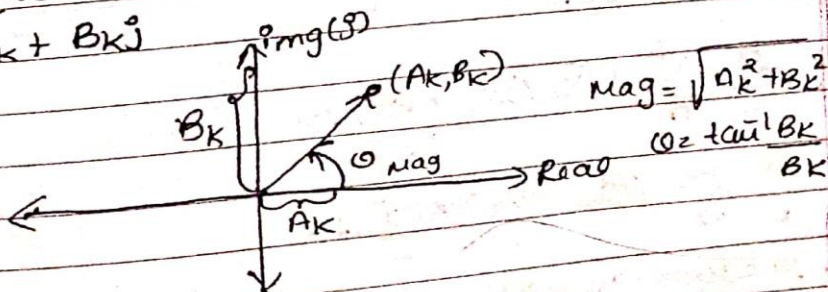
check $X_k = x_0 e^{-j2\pi k \cdot 0/N} + x_1 e^{-j2\pi k \cdot 1/N} + \dots + x_n e^{-j2\pi k \cdot (N-1)/N}$

\uparrow n th sample value.

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

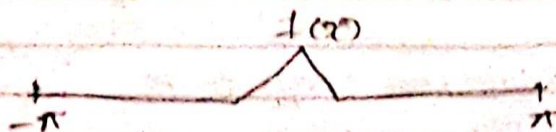
$$X_k = x_0 [\cos(-b_0) + j \sin(-b_0)] + \dots$$

$$X_k = A_k + B_k j$$



ex.

Fourier series - part 1



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

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

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

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

$$\begin{aligned} \vec{f} &= \langle \vec{f}, \vec{x} \rangle \frac{\vec{x}}{\|\vec{x}\|^2} + \langle \vec{f}, \vec{y} \rangle \frac{\vec{y}}{\|\vec{y}\|^2} \\ &= \langle \vec{f}, \vec{u} \rangle \frac{\vec{u}}{\|\vec{u}\|^2} + \langle \vec{f}, \vec{v} \rangle \frac{\vec{v}}{\|\vec{v}\|^2} \end{aligned}$$

Part 2



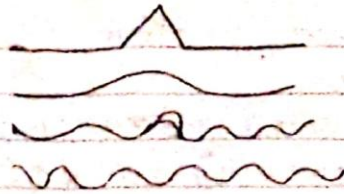
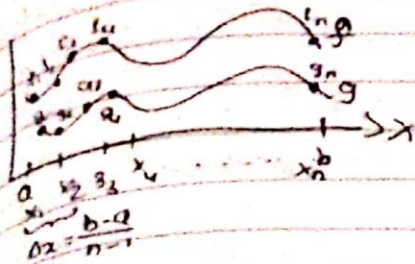
$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty} \left(A_k \cos\left(\frac{kx}{L}\right) + B_k \sin\left(\frac{2n\pi kx}{L}\right) \right)$$

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

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

* Inner product zu Hilbert transform

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



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

$$\langle f, g \rangle = g^T f = \begin{bmatrix} g_1 & g_2 & \dots & g_n \end{bmatrix} \begin{bmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{bmatrix}$$

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

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

Complex Fourier Series ($e^{ikx} = \cos(kx) + i \sin(kx)$)

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

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

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

→ these PS are orthogonal to each other

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

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

* Fourier Series using MATLAB

clear all, clc, close all, cloc

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

$p = 0 + x;$

$f(N/4:N/2) = 4 * (1:N/4+1)/N;$

$f(N/2+1:3*N/4) = 1 - 4 * (0:N/4-1)/N;$

plot(x,f,'-k','LineWidth',3,'hold on

% compute fourier series

cc = get(20);

$A_0 = \text{sum}(f * \text{ones}(\text{size}(x))) * dx / p;$

$fFS = A_0/2;$

for k=1:20

$A(k) = \text{sum}(f * \cos(\pi * k * x/L)) * dx / p;$

$B(k) = \text{sum}(f * \sin(\pi * k * x/L)) * dx / p;$

$fFS = fFS + A(k) * \cos(k * \pi * x/L) + B(k) * \sin(k * \pi * x/L);$

plot(x,fFS,'-', 'color', cc(k,:), 'LineWidth', 2)

pause(1)

end

% plot amplitude

fig = set(gcf, 'Position', [1500 200 800 1200])

clear ERR

clear A

$fFS = A_0/2;$

$A(1) = A_0/2 / p;$

$ERR(1) = \text{norm}(f - fFS);$

$kmax = 100;$

for k=1:kmax

$A(k+1) = \text{sum}(f * \cos(\pi * k * x/L)) * dx / p;$

$B(k+1) = \text{sum}(f * \sin(\pi * k * x/L)) * dx / p;$

$fFS = fFS + A(k+1) * \cos(k * \pi * x/L) + B(k+1) * \sin(k * \pi * x/L);$

$ERR(k+1) = \text{norm}(f - fFS) / \text{norm}(f);$

end

$\text{thresh} = \text{median}(\text{EER}) + \text{sqrt}(\text{kmax}) * 4 / \text{sqrt}(2);$
 $y = \max(\text{find}(\text{EER} > \text{thresh})).$

$z = 7;$

$\text{subplot}(2,1,1)$

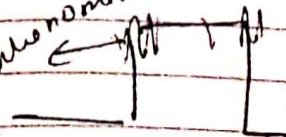
$\text{demology}(0:1:\text{kmax}, A, 'k', 'linewidth', 1.5)$
 hold on.

→ Fourier series using Python

IS Implementation using the Python code.

→ Fourier series and Gibbs phenomena in Matlab.

Gibbs phenomenon.



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

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

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

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

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

AFTERNOON SESSION DETAILS

Image of session

The screenshot displays the Udemy interface for the course 'The Python Mega Course: Build 10 Real World Applications'. The main video player shows a code editor with the following Python code:

```
website_blocker.py - D:\Dropbox\python\block_website\Demo - Atom
File Edit View Selection Find Packages Help
- Demo
  Architecture
  hosts
  website_blocker.py
1 import time
2 from datetime import datetime as dt
3
4 hosts_temp="hosts"
5 hosts_path="C:\Windows\System32\drivers\etc\hosts"
6 redirect="127.0.0.1"
7 website_list=["www.facebook.com","facebook.com","dub119.mail.live.com","www.dub119.mail.live.com"]
8
9 while True:
10     if dt(dt.now().year,dt.now().month,dt.now().day,16) < dt.now() < dt(dt.now().year,dt.now().month,dt.now().day,19):
11         print("Marking hours...")
12         with open(hosts_path,"r") as file:
13             content=file.readlines()
14             for website in website_list:
15                 if website in content:
16                     pass
17                 else:
18                     file.write(redirect+" "+website+"\n")
19             else:
20                 with open(hosts_path,"r") as file:
21                     content=file.readlines()
22                     file.seek(0)
23                     for line in content:
24                         if not any(website in line for website in website_list):
25                             file.write(line)
26                             file.truncate()
27                     print("Fun hours...")
28                     time.sleep(5)
```

The course content sidebar on the right lists the following lessons and sections:

- 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 (1 / 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)

25/05-2020
Sec 18:

Firing Errors (2 type)

1) Syntax Error 2) Exception Error.

Sec 19: Website Blocker Demo - daily blocker
- o1n1tch9ur0.ppt

Windows: C:\Windows\System32\drivers\etc\hosts
→ websiteblocker.py [Method: When host is coming]
1. Report time.
2. host_path = r"C:\Windows\System32\drivers\etc\hosts"
3. Redirect = "127.0.0.1"
4. website_list = ["www.facebook.com", "facebook.com",
"whatsapp.com", "mail.ru.com",]
5. while True:
6. time.sleep(5)

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

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

→ Setting up the infinite loop

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

hostcomp # host

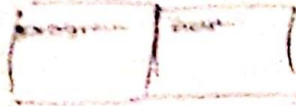
1. Report time

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.ru.com", "www.dub119-mail.ru.com")



classmate
Date
Page

code to this:

```
if dt.now().year, dt.now().month, dt.now().day > dt.now().now().year, dt.now().now().month, dt.now().day, 10):
    print("working hours")
```

else:

print("fun hours...")

time.sleep(5)

O/P: Fun hours... printed every 5 sec.
Fun hours...

→ Implementing first part

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

~~open first part~~

→ with open(host + ".txt") as file:

content = file.read()

print(content)

else:

print("Fun hours...")

time.sleep(5)

2nd part

→ content = file.read()

for website in website_list:

if website in content:

pass

else:

file.write("connect" + " " + "http://" + " " + "website")

20. else:

print("fun hours...")

Implementing second part

~~if~~ first part is name as refer.

20. else:

21. with open(hosts temp, 'r+') as file:

22. content = file.readlines()

23. ~~file.seek(0)~~
24. for line in content:

25. if not many (website in line
for website in website_list):

26. file.write(line)

27. file.truncate()

28. print("fun hours...")

30. time.sleep(5)

154 → Scheduling Python program in windows

to schedule a python script for execution on python Anywhere.

1. <https://www.pythonanywhere.com>

2. Dashboard → file → upload file, and upload the python file

3. Task → set the time of day that want your script to be executed & the name of python file you uploaded (eg. myscript.py)

• enter date time in UTC.

4. click - create button



