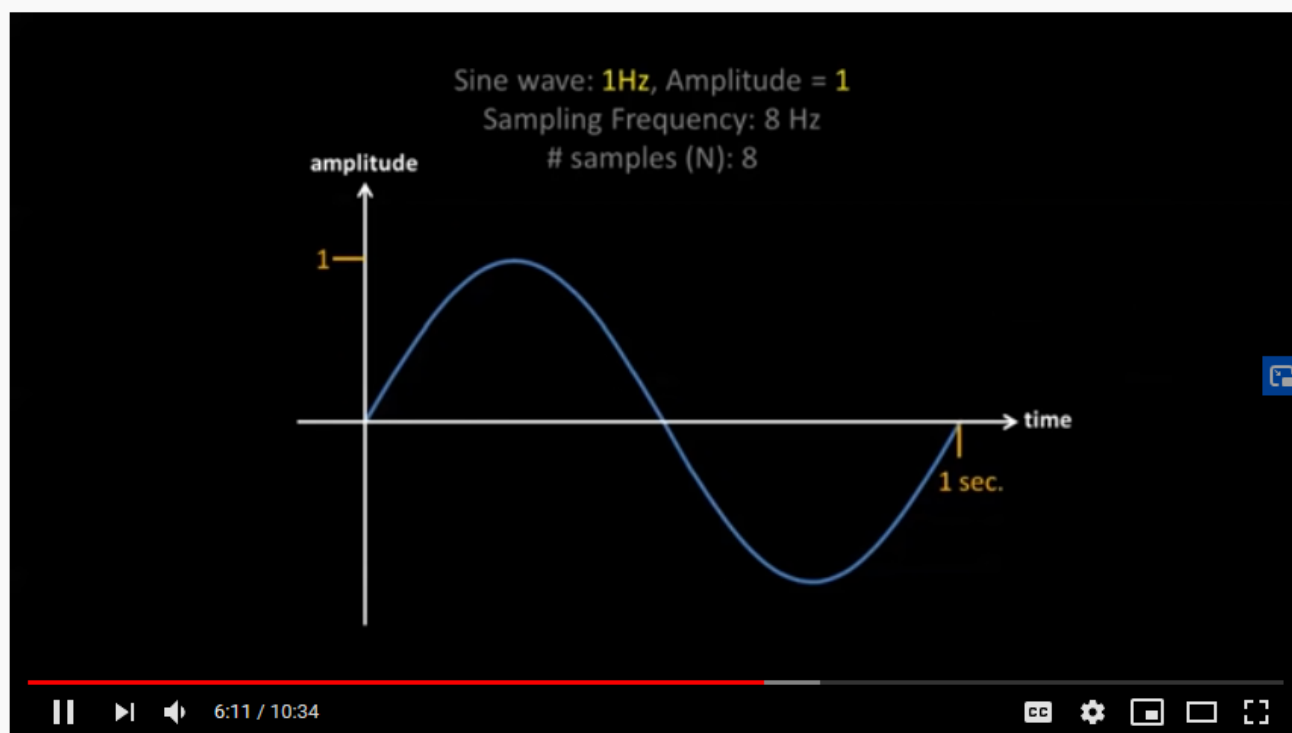


DAILY ASSESSMENT FORMAT

Date:	25 may 2020	Name:	Nishanth
Course:	Digital signal processing	USN:	4a117ec063
Topic:	1.Introduction to Fourier Series & Fourier Transform 2.Fourier Series – Part 1 3.Fourier Series – Part 2 4.Inner Product in Hilbert Transform 5.Complex Fourier Series. Fourier Series using MATLAB(Use Octave to execute the code) 6. Fourier Series using Python (Experience implementation using Python) 7. Fourier Series and Gibbs Phenomena Using MATLAB	Semester & Section:	6 th & B
Github Repository:	nishanthvr		

FORENOON SESSION DETAILS

Image of session



Discrete Fourier Transform - Simple Step by Step

Nishanth V.R

4417EC063

Subject

Digital Signal Processing

① Introduction to Fourier Series & Fourier Transform

datasciencetool.com

Fourier transform is a "coordinate transform"

(FFT) fast Fourier transform used in modern cell processing activities

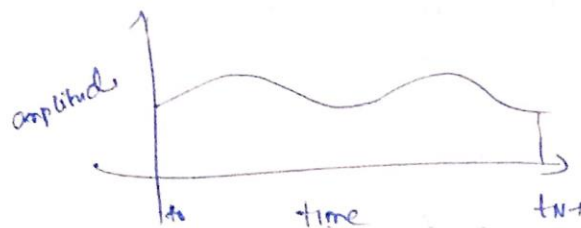
Fourier Series

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

Fourier transform

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

analyze fctn



discrete Fourier transform

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

discrete

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

Evaluating at n to N

Fourier Series - part 1

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

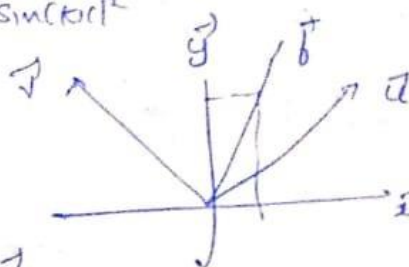
$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty} (A_k \cos(kx) + B_k \sin(kx))$$

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

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

$$\vec{b} = \langle \vec{b}, \vec{x} \rangle \frac{\vec{x}}{\|\vec{x}\|} + \langle \vec{b}, \vec{y} \rangle \vec{y}$$

$$= \langle \vec{b}, \vec{u} \rangle \frac{\vec{u}}{\|\vec{u}\|} + \langle \vec{b}, \vec{v} \rangle \frac{\vec{v}}{\|\vec{v}\|}$$



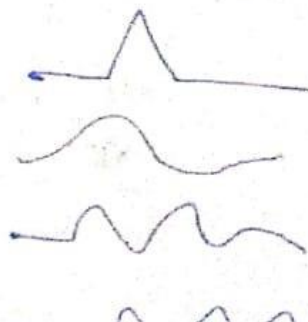
Fourier Series part 2

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

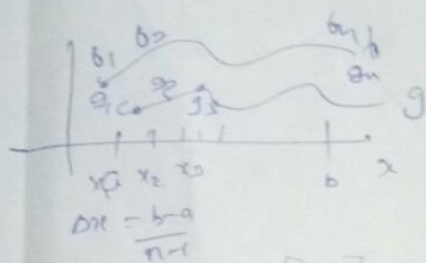
$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty} (A_k \cos(\frac{2\pi k x}{L}) + B_k \sin(\frac{2\pi k x}{L}))$$

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

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



Inner product in Hilbert Space



$$\langle f(x) | g(x) \rangle = \int_b^a f(x) \bar{g}(x) dx$$

$$f = \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{bmatrix} \quad g = \begin{bmatrix} g_1 \\ g_2 \\ \vdots \\ g_n \end{bmatrix}$$

$$\langle f | g \rangle = g^T f = \begin{bmatrix} g_1 & g_2 & \dots & g_n \end{bmatrix} \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{bmatrix}$$

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

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

Complex Fourier Series

$$f(x) = \sum_{k=-\infty}^{\infty} C_k e^{ikx} = \sum_{k=-\infty}^{\infty} (a_k + ib_k) (\cos(kx) + i \sin(kx))$$

$$(C_k = \overline{C_{-k}} \text{ if } f(x) \text{ real})$$

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

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

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

Fourier Series (python)

```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import colorConverter
plt.rcParams['color'] = 'red'
```

```
# define domain
```

```
dx = 0.01
```

```
L = np.pi
```

```
x = np.arange(-L+dx, L+dx, dx)
```

```
n = len(x)
```

```
n_sqrt = int(np.floor(n/4))
```

Fourier Series & Gibbs phenomenon

clear all

close all

L = 10

dx = 4/(N+1)

x = 0:dx:L

b = zeros(8:3(x))

b = (256b:768):1;

A0 = sum(b.*ones(size(x)) * dx * 2/;

b0 = A0/2;

for k = 1:100

Ak = sum(b.*cos(2*pi*k*x/L)) * dx * 2/;

Sk = sum(b.*sin(2*pi*k*x/L)) * dx * 2/;

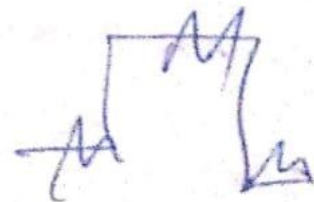
bE1 = bFS + Ak * cos(2*pi*k*x/L) * Bk + 2*(2*pi*k)

end

plot(x, b, 'k', 'linewidth', 4) hold on

plot(x, bE1, 'k', 'linewidth', 3)

set(xf, 'position', [1500, 200, 2500, 1500])



Gibbs phenomenon

Date: 25 may 2020
Course: python
Topic: Fixing programming error,
Application 3 websites blocker

Name: nishanth
USN: 4a17ec063
Semester & Section: 6th & B

AFTERNOON SESSION DETAILS

Image of session

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

```
a = 1
b = "2"
c = 3
print(int(2.5))
print(c/0)
```

Below the code, a terminal window shows a traceback for a `ZeroDivisionError: division by zero` at line 5, in module `errors.py`. The video player controls at the bottom indicate the video is at 0:43 / 5:38.

On the right side, the 'Course content' sidebar is visible, showing the following structure:

- Webmaps with Python and Folium (1 / 16 | 1hr 20min)
- Section 18: Fixing Programming Errors (6 / 6 | 39min)
 - 142. Syntax Errors (8min)
 - 143. Runtime Errors (11min)
 - Quiz 4: Errors
 - 144. How to Fix Difficult Errors (6min)
 - 145. Good Programming Questions (6min)
 - 146. Error Handling (8min)
- Section 19: Application 3: Build a

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

Error handling

1.syntax error

In this I learn how to check the syntax error how we can identify that in python

2.Runtime error

3.error handling

Application 3 websites blocker:

Program:

Import time

From.datetime.import.datetime as dt

Hosts temp=r"D:\Dropbox\pp\blocks_websites\Demo\hosts"

Hosts.path="/etc/hosts"

Redirect="127.0.0.1"

Website_list=["www.facebook.com","facebook.com","dub119.mail.live.com",www.dub119.mail.live.com]

Else:

File.write(redirect+"."+website+"\n")

Else:

With.open(hosts.math,'c+')as.file:

Content=file.file.readlines()

File.seek(0)

For line in content:

If not any(websites.in line for websites in website.lists):

File.write(line)

File.truncate()

Print("fun.hours....")

Time.sleep(5)

