DAILY ASSESSMENT FORMAT

Date:	29 MAY 2020	Name:	Karegowda kn
Course:	Digital Signal Processing	USN:	4al16ec029
Topic:	Introduction to Fourier Series,Fourier Transform,Hilbert Transform,Fourier Series Using Matlab	Semester & Section:	6th sem & B sec
Github Repository:	karegowda-courses		

FORENOON SESSION DETAILS
Report – Introduction to Fourier Series and Fourier Transform Fourier Series Fourier Transform Euler's Formula $f(x)=\frac{1}{-\infty}a_0+\sum_{-\infty}^{\infty}(a_k cos 2kt+b_k sin 2kt)$ $X(F)=\int_{-\infty}^{\infty} x(t)e^{-j2Ft}dt$ $\sum_{N-1}$

$X_k = \sum x_n e^{j2\Pi kn/N} n=0$

2

Hilbert Transform

Complex Fourier Series

$X_k = x_0[cos(-b0) + jsin(-b0) + ... X_K = A_K + B_{Kj}$

b

$< f(x),g(x) >= \int f(x)g(x)\, dx\ a$

n
$<f,g>\Delta X = \sum f(x,K)g(x)\Delta X\ K=1$

∞
$f(x) = \sum C_k e^{iKX}\ k=-\infty$

$e^{iKX} = cos(Kx) + isin(Kx)$

Fourrier Series Using Matlab 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;

ππ

$< \varphi \varphi >= \int e^{ijk} e^{-jkX} dx = \int e^{i(j-k)X} dx = 1\ [e^{i(j-K)x}]^{\pi}$

j, k $i(j-K)$ $-\pi$ $-\pi$ $-\pi$

0 *if* $j =/ k$ 2π *if* $j = k$

```
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
%% plot amplitudes
figure;
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; B(k+1)=sum(f.*sin(pi*k*x/L))*dx;
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(ERR)*sqrt(kmax)*4/sqrt(3); r=max(find(ERR>thresh));
r=7;
subplot(2,1,1)
semilogy(0:1:kmax,A,'k','linewidth',1.5)
hold on semilogy(r,A(r+1),'co','Linewidth',15,'MarkerFaceColor','c') xlim([0
kmax])
xlim([10^(-7) 1])
ylabel('Mode Amplitude','FonSize',16)
subplot(2,1,2)
semilogy(0:1:kmax,ERR,'k','Linewidth',1.5)
hold on semilogy(r,ERR(r+1),'co','Linewidth',15,'MarkerFaceColor','c')
```

```
xlabel('Mode Number,k','FontSize',16) ylabel('Reconstruction
Error','FontSize',16)

Fourier Series and Gibbs Phenomena [Matlab] clear all;
close all;
l=2*pi

N=1024 dx=l/(N-1) x=0:dx:l



f=zeros(size(x))
f(256:768)=1
figure
set(gcf,'Position',[1500 200 2000 1000]) fFs=zeros(size(x));
A0=(1/pi)*sum(f.*ones(size(x)))*dx;

for m=1:100 fFs=A0/2; for k=1:m

Ak=(1/pi)*sum(f.*cos(2*pi*k*x/l))*dx; Bk=(1/pi)*sum(f.*sin(2*pi*k*x/l))*dx;
fFs=fFs+Ak*cos(2*k*pi*x/l)+Bk*sin(2*k*pi*x/l)

end plot(x,f,'k','LineWidth',2) hold on plot(x,fFs,'k','LineWidth',1.5) pause(0.1)

end
```

Date:	29 MAY 2020	Name:	Karegowda kn
Course:	Python	USN:	4AL16ec029
Topic:	More on functions	Semester & Section:	6th sem & B sec

AFTERNOON SESSION DETAILS

Report--

1. Functions with multiple arguments

```
def area(a, b):
    return a * b
print (area(6, 7))
```

✓ Python was the sixth most popular programming language in 2010 on StackOverflow (left image). It continually went up in the ranks to being the most popular among all in 2018 (right image).

2.default and non default parameters and keyword and non keyword argument

```
def area(a, b):
    return a * b
print (area(6, 7))
```

3.functions with an arbitrary number of non keyword argument

```
def mean(*args):
        return sum(args)/ Len(args)
print (mean(1, 2, 3, 4)
```

4.functions with an arbitrary number of keyword argument

```
def mean(**kwargs):
        return kwargs
print (mean(a=1, b=2, c=3, d=4))
```

5.summary