**ARYAMAN MISHRA**

**19BCE1027**

syms t

n= input('Enter the number of data points n : '); % number of x values

x\_0= input('Enter the starting value of x : '); % x\_1 [x(1), x(n)] x\_1=x\_0+s, x\_2=x\_1+s= x\_0+2s

count = input('type 0 if the unit of x is deg. type a non-zero number otherwise');

s=input('Enter the length of the spacing between successive values of x :');

n1= input('Enter the number of harmonic of the series n1 : '); % a\_1, a\_2, a\_{n1}

for i=1:n

x(i)=x\_0+(i-1)\*s;

end % x\_1, x\_2, x\_3, .... , x\_n x\_2-x\_1=s

if (count == 0)

x=x\*pi/180;

s=s\*pi/180;

end

y = input('Enter the y values (as a row vector) :') % y=[y\_1 y\_2 y\_3 y\_n]

if y(1)== y(n)

l=0.5\*(x(n)-x(1)); % l=pi if it is degree function f has period 2pi

else

l=0.5\*(x(n)+s-x(1));

end

a\_0= (2/n)\*sum(y)

for i=1:n1

yc=y.\*cos(i\*pi\*x/l);

ys=y.\*sin(i\*pi\*x/l);

a(i)=(2/n)\*sum(yc);

b(i)=(2/n)\*sum(ys);

end

F\_s=a\_0/2;

for i=1:n1

subplot(n1,1,i)

plot(x,y,'r\*');

hold on

F\_s = F\_s+a(i).\*cos(i\*pi\*t/l)+b(i).\*sin(i\*pi\*t/l); % a(i).\*cos(i\*pi\*t/l)+b(i).\*sin(i\*pi\*t/l) is called fundamentals of harmonics or i^th harmonic

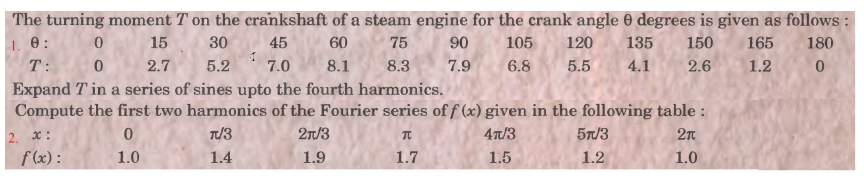
subplot(n1,1,i)

ezplot(F\_s, [x(1) x(n)])

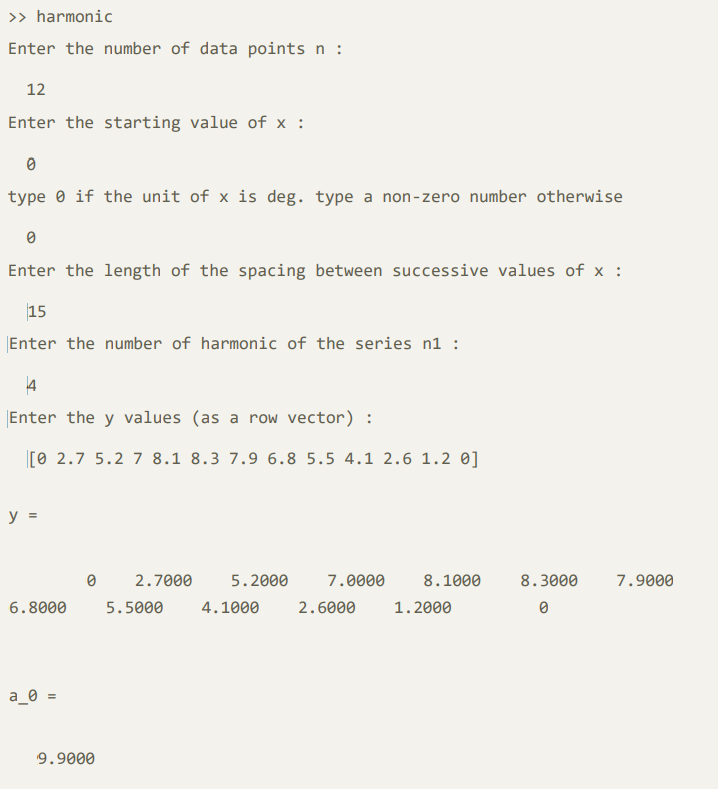
end

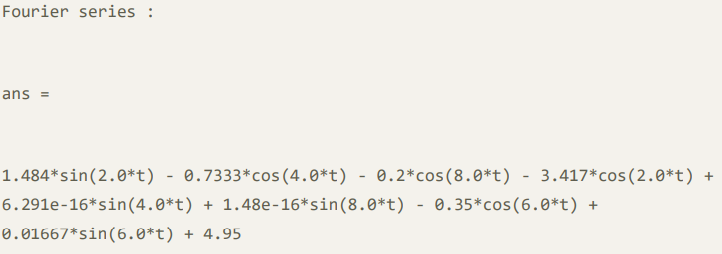
disp('Fourier series :')

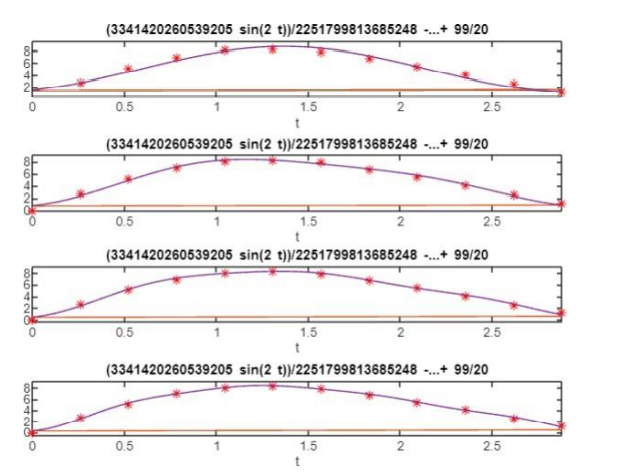
vpa(F\_s,4)



1)







2)

