**Code for Fourier Series without tolerance limit**

clc

clear

deff('a=f(x)','a=x^2');

function [**a0**, **A**, **B**]=fourier(**l**, **n**, **f**)

**a0**=(1/**l**)\*integrate('f(x)','x',-**l**,**l**);

for i=1:**n**

function **b**=f1(**x**, **f**)

**b**=**f**(**x**)\*cos(i\*%pi\***x**/**l**);

endfunction

function **c**=f2(**x**, **f**)

**c**=**f**(**x**)\*sin(i\*%pi\***x**/l);

endfunction

A(i)=(1/l)\*integrate('f1(x)','x',-l,l);

B(i)=(1/l)\*integrate('f2(x)','x',-l,l);

end

x=-5\*l:.1:5\*l;

series=a0/2;

for i=1:n

series=series+A(i)\*cos(i\*%pi\*x/l)+B(i)\*sin(i\*%pi\*x/l);

end

plot(x,series)

endfunction

Console Output:

[a0,A,B]=fourier(2,6,f)

B =

0.

0.

0.

0.

0.

0.

A =

-1.6211389

0.4052847

-0.1801265

0.1013212

-0.0648456

0.0450316

a0 =

2.6666667

