a = input('Enter the lower limit: ');

b = input('Enter the upper limit: ');

a = a\*pi/180;

b = b\*pi/180;

%-------------------- TRAPEZOIDAL RULE --------------------

trapezoid\_sin = zeros(1,10);

for n = 1:10

h = (b-a)/n;

sum = 0.5\*(sin\_value(a)+sin\_value(b));

for i = 1:n-1

sum = sum + sin\_value(a+ i\*h);

end

I = sum \* h;

trapezoid\_sin(n) = I;

end

figure

plot(trapezoid\_sin,'rx-','LineWidth',1)

title('TRAPEZOIDAL - SIN PLOT');

xlabel('NO.OF INTEGRAL INTERVALS');

ylabel('INTEGRAL VALUE OF SINX');

grid ON

trapezoid\_cos = zeros(1,10);

for n = 1:10

h = (b-a)/n;

sum = 0.5\*(cos\_value(a)+cos\_value(b));

for i = 1:n-1

sum = sum + cos\_value(a+ i\*h);

end

I = sum \* h;

trapezoid\_cos(n) = I;

end

figure

plot(trapezoid\_cos,'rx-','LineWidth',1)

title('TRAPEZOIDAL - COS PLOT');

xlabel('NO.OF INTEGRAL INTERVALS');

ylabel('INTEGRAL VALUE OF COSX');

grid ON

%-------------------- SIMPSON 1/3 RULE --------------------

simpson3\_sin = zeros(1,10);

for n = 1:10

h = (b-a)/n;

sum = sin\_value(a)+sin\_value(b);

for i = 1:n-1

if rem(i,2)==0

sum = sum + 2\*sin\_value(a+ i\*h);

else

sum = sum + 4\*sin\_value(a+ i\*h);

end

end

I = sum \* (h/3);

simpson3\_sin(n) = I;

end

figure

plot(simpson3\_sin,'bx-','LineWidth',1)

title('SIMPSONS 1/3 - SIN PLOT');

xlabel('NO.OF INTEGRAL INTERVALS');

ylabel('INTEGRAL VALUE OF SINX');

grid ON

simpson3\_cos = zeros(1,10);

for n = 1:10

h = (b-a)/n;

sum = cos\_value(a)+cos\_value(b);

for i = 1:n-1

if rem(i,2)==0

sum = sum + 2\*cos\_value(a+ i\*h);

else

sum = sum + 4\*cos\_value(a+ i\*h);

end

end

I = sum \* (h/3);

simpson3\_cos(n) = I;

end

figure

plot(simpson3\_cos,'bx-','LineWidth',1)

title('SIMPSONS 1/3 - COS PLOT');

xlabel('NO.OF INTEGRAL INTERVALS');

ylabel('INTEGRAL VALUE OF COSX');

grid ON

%-------------------- SIMPSON 3/8 RULE --------------------

simpson38\_sin = zeros(1,10);

for n = 1:10

h = (b-a)/n;

sum = sin\_value(a)+sin\_value(b);

for i = 1:n-1

if rem(i,3)==0

sum = sum + 2\*sin\_value(a+ i\*h);

else

sum = sum + 3\*sin\_value(a+ i\*h);

end

end

I = sum \* (3\*h/8);

simpson38\_sin(n) = I;

end

figure

plot(simpson38\_sin,'gx-','LineWidth',1)

title('SIMPSONS 3/8 - SIN PLOT');

xlabel('NO.OF INTEGRAL INTERVALS');

ylabel('INTEGRAL VALUE OF SINX');

grid ON

simpson38\_cos = zeros(1,10);

for n = 1:10

h = (b-a)/n;

sum = cos\_value(a)+cos\_value(b);

for i = 1:n-1

if rem(i,3)==0

sum = sum + 2\*cos\_value(a+ i\*h);

else

sum = sum + 3\*cos\_value(a+ i\*h);

end

end

I = sum \* (3\*h/8);

simpson38\_cos(n) = I;

end

figure

plot(simpson38\_cos,'gx-','LineWidth',1)

title('SIMPSONS 3/8 - COS PLOT');

xlabel('NO.OF INTEGRAL INTERVALS');

ylabel('INTEGRAL VALUE OF COSX');

grid ON

function [val] = sin\_value(x)

n = 15;

sine = zeros(1,n);

sum = 0;

for i = 0:n-1

sum = sin(x,i,sum);

sine(i+1) = sum;

end

conv = error\_conv(sine,n);

val = sine(conv);

function [sum] = sin(x,i,sum)

temp = ((power(-1,i) \* power(x,(2\*i)+1)) /factorial((2\*i)+1));

sum = sum + temp;

end

end

function [val] = cos\_value(x)

n = 15;

cosine = zeros(1,n);

sum = 0;

for i = 0:n-1

sum = cos(x,i,sum);

cosine(i+1) = sum;

end

conv = error\_conv(cosine,n);

val = cosine(conv);

function [sum] = cos(x,i,sum)

temp = ((power(-1,i) \* power(x,2\*i)) /factorial(2\*i));

sum = sum + temp;

end

end

function [conv] = error\_conv(values,n)

error = zeros(1,n-1);

conv = NaN;

for i = 1:n-1

error(i) = round(values(i+1)-values(i),10);

end

for i = 1:n-2

if error(i+1)==error(i)

conv = i+1;

break

end

end

end