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%Lab:-6
%Title:- To Integrate given function using Newton Cote's Quadrature Formula.
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%Date:- 2025/01/03
%-----Three Critical statements-----

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close all;
clear variables;
clc;

%-----User Input Section-----
func=input('enter the function f(x)=');
f=inline(func);
disp(f);
a=input('enter the lower limit a= ');
b=input('enter the lower limit b= ');

%-----Calculation Section-----
n=6;
h=(b-a)/n;
x(1)=a;
y(1)=f(a);
for i=1:n
    x(i+1)=x(i)+h;
    y(i+1)=f(x(i+1));
end
out=[x;y];
disp (out);

%-----Trapezoidal Rule-----
N=length(y);
temp=0;
for i=2:N-1

    temp=temp+2*y(i);

end
I=(h/2)*(y(1)+y(N)+temp);
result = Strcat('By trapezoidal rule, I= ',num2Str(I));
disp(result);

%-----Simpson's 1/3 th rule-----
temp=0;
for i=2:N-1
    if (mod(i,2)==0)
        temp=temp+4*y(i);
    else
        temp=temp+2*y(i);
    end
end
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end
I=(h/3)*(y(1)+y(N)+temp);
result = Strcat('By Simpsons 1/3 rd rule, I= ',num2Str(I));
disp(result);

%-----Simpson's 3/8 th rule-----
temp=0;
for i=2:N-1
    if (mod(i+2,3)==0)
        temp=temp+2*y(i);
    else
        temp=temp+3*y(i);
    end
end
I=((3*h)/8)*(y(1)+y(N)+temp);
result = Strcat('By Simpsons 3/8 th rule, I= ',num2Str(I));
disp(result);
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