NAME: MAYUR PIMPUDE CLASS: D1AD ROLL NO.:43 AY: 2020-21

SCI-LAB PRACTICAL 1: MODIFIED EULER'S METHOD

QUESTION: $dx/dy = y + x^2$, y(0)=1 for x=0.1 and h=0.05

```
INPUT:
clc:
deff('[d]=f(x,y)', 'd=x^2+y');
  x0=input("enter x0 value:")
  y0=input("enter y0 value:")
  h=input("enter value of h:")
  xn=input("enter final value of x:")
  n=input("enter number of iteration:")
  for i=1:n;
     disp('step=',(i));
     x(i)=x0+h;
     y(i)=y0+h*(f(x0,y0));
     disp('at x='); disp(x(i));
     disp('euler solution y=',y(i));
     disp("modified solution y=")
     for j=1:7;
       y(i)=y0+0.5*h*(f(x0,y0)+f(x(i),y(i)));
       disp(y(j));
       y(i)=y(j);
  end
  if x(i) == xn then
     break;
  else x0=x(i);
     y(0)=y(i);
    end
  end
Output:
enter x0 value:0
enter y0 value:1
enter value of h:0.05
enter final value of x:0.1
enter number of iteration:5
```

```
"step="
1.
 "at x="
 0.05
 "euler solution y="
 1.05
"modified solution y="
 1.0513125
 1.0513453
 1.0513461
 1.0513462
 1.0513462
 1.0513462
```

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SCI-LAB PRACTICAL 2: Runge kutta method of order four

QUESTION: $dx/dy = y + x^2$, y(0)=1 for x=0.1 and h=0.05

INPUT:

```
clc;
deff('g=f(x,y)', 'g=y+x^2');
xo=input("Enter initial value of xo: ")
yo=input("Enter the value of yo: ")
h=input("Enter value of h: ")
xn=input("Enter Final value of xn: ")
n=(xn-xo)/h;
disp('number of iterations:',n);
for i=1:n
  disp('step=',i)
  k1=h*f(xo,yo);
  k2=h*f(xo+(h/2),yo+(k1/2));
  k3=h*f(xo+(h/2),yo+(k2/2));
  k4=h*f(xo+h,yo+k3);
  y1=yo+(1/6)*(k1+2*k2+2*k3+k4);
  xo=xo+h;
  disp('k1=',k1)
  disp('k2=',k2)
  disp('k3=',k3)
  disp('k4=',k4)
  disp("x=",xo);disp("y=",y1);
  yo=y1
end
```

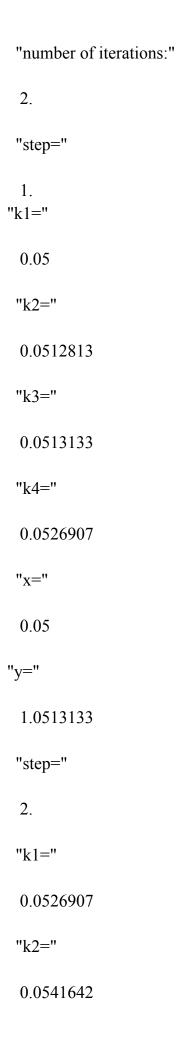
OUTPUT:

Enter initial value of xo: 0

Enter the value of yo: 1

Enter value of h: 0.05

Enter Final value of xn: 0.1



"k3="

0.0542010

"k4="

0.0557757

"x="

0.1

"y="

1.1055128

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SCI-LAB PRACTICAL 3: Simpson's 1/3rd Method

QUESTION: $\int 5/x \, dx$ by dividing intervals into 10 subintervals.

INPUT:

```
clc;
funcprot(0);
function ans=simpson(a, b, n, g)
disp('lower limit is=',a);
disp('upper limit is=',b);
disp('number od interval=',n);
  h=(b-a)/n;
  sum=0;
  for i=1:n-1
    x=a+i*h;
    if modulo(i,2)==0
       sum = sum + 2*g(x);
     else
       sum = sum + 4*g(x);
     end
  end
  ans=(h/3)*(g(a)+g(b)+sum);
endfunction
OUTPUT:
deff('y=f(x)',y=5/x')
--> simpson(1,2,10,f)
 "lower limit is="
  1.
 "upper limit is="
  2.
 "number of interval="
```

```
10.
ans =
3.4657512
```

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SCI-LAB PRACTICAL 4: Simpson's 3/8rd Method

QUESTION: $\int (4+x^2)$ by dividing intervals into 12 subintervals.

INPUT:

```
deff('y=f(x)','y=x^2+4');
a=input("Enter Lower Limit: ");
b=input("Enter Upper Limit: ");
n=input("Enter number of sum intervals: ");
h=(b-a)/n;
add1=0;
add2=0;
add3=0;
for i=0:n;
  x=a+i*h;
  y=f(x);
  disp([x y]);
  if (i==0)|(i==n) then
    add1=add1+y
     else if (modulo(i,3)==0) then
     add2=add2+y;
  else
     add3=add3+y;
  end
end
end
I=((3*h)/8)*(add1+2*add2+3*add3);
disp(I,"Integration by Simpsons (3/8)th Rule is:");
```

OUTPUT:

Enter Lower Limit: 7

Enter Upper Limit: 7.8

Enter number of sum intervals: 12

7. 53.

7.0666667 53.937778

7.1333333 54.884444

7.2 55.84

7.2666667 56.804444

7.3333333 57.77778

7.4 58.76

7.4666667 59.751111

7.5333333 60.751111

7.6 61.76

7.6666667 62.777778

7.7333333 63.804444

7.8 64.84

"Integration by Simpsons (3/8)th Rule is:"

47.050667