Week-11 Program-05

Due on 2020-04-16, 23:59 IST

Write a C program to solve the following differential equation using Runge-Kutta method. Step size $h=0.2$

$$\frac{dy}{dx} + 3y^2 = x(2x + 1), \quad y(0.3) = 2$$

Find $y(x)$ for different values of $x$ as given in the test cases.

**Sample Test Cases**

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Case 1</td>
<td>0.6</td>
<td>y=1.647903</td>
</tr>
<tr>
<td>Test Case 2</td>
<td>1</td>
<td>y=1.463419</td>
</tr>
<tr>
<td>Test Case 3</td>
<td>0.9</td>
<td>y=1.537934</td>
</tr>
<tr>
<td>Test Case 4</td>
<td>1.2</td>
<td>y=1.420803</td>
</tr>
</tbody>
</table>

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Sample solutions (Provided by instructor)

```c
#include<stdio.h>
float func(float x,float y);
int main()
{
    float x0;
    //printf("Enter xn:");
    scanf("%f",&x0); // xn will be taken from test cases
    //Use printf statement as: printf("y=\%%fn",y0);
    float m1,m2,m3,m4,m,h=0.2;
    float x0 = 0.3, y0 = 2;
```
```
while (x0 < xn)
{
    m1 = func(x0, y0);
    m2 = func((x0+h/2.0),(y0+m1*h/2.0));
    m3 = func((x0+h/2.0),(y0+m2*h/2.0));
    m4 = func((x0+h),(y0+m3*h));
    m = ((m1+2*m2+2*m3+m4)/6);
    y0 = y0+m*h;
    x0 = x0+h;
    printf("y=%f\n", y0);      // Final output
    return 0;
}
```

```c
float func(float x, float y)
{
    float m;
    m = (x*(2*x+1) - 3*y*y)/10;
    return m;
}
```

**Week 11**

- **Lecture 51**: Interpolation (unit? unit=12&lesson=65)
- **Lecture 52**: Trapezoidal Rule and Runge-Kutta Method (unit? unit=12&lesson=66)
- **Lecture 53**: Recursion (unit? unit=12&lesson=67)
- **Lecture 54**: Recursion (Contd.) (unit? unit=12&lesson=68)
- **Lecture 55**: Structure (unit? unit=12&lesson=69)
- **Quiz**: Assignment 11 (assessment? name=158)
- **Week-11 Program-01** (/noc20_cs06/progassignment? name=169)
- **Week-11 Program-02** (/noc20_cs06/progassignment? name=170)
- **Week-11 Program-03** (/noc20_cs06/progassignment? name=171)
- **Week-11 Program-04** (/noc20_cs06/progassignment? name=172)
- **Week-11 Program-05** (/noc20_cs06/progassignment? name=173)
- **Feedback For Week 11** (unit? unit=12&lesson=183)

**Week 12**
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