



D:\Acads\CL249\Assignment7

Current Folder

Name

- solver.pdf
- main.pdf
- derivative.p...
- main.m
- solver.m
- derivative.m
- main.asv

solver.m (Fu...

Defining step size

solver(a, b, ...

```

7
8 % Loop for plotting function for different Step sizes
9 for i = 1:16
10 % Number of steps (increasing in every iteration)
11 N = 2^(i-1);
12
13 % Getting Y1 and Y2 and their convergence truth value
14 [X, Y1, Y2] = solver(a, b, N);
15
16 Y1_conv = 1; % Assuming Y1 Converges (True/False)
17 Y2_conv = 1; % Assuming Y2 Converges (True/False)
18
19 for j = 1:length(Y1_pre)
20 if abs((Y1((2*j) - 1) - Y1(j))/Y1((2*j) - 1)) > e
21 Y1_conv = 0;
22 break;
23 end
24 end
25 for j = 1:length(Y2_pre)
26 if abs((Y2((2*j) - 1) - Y2(j))/Y2((2*j) - 1)) > e
27 Y2_conv = 0;
28 break;
29 end
30 end
31
32 figure(1);
33 plot(X, Y1);
34 xlabel('X')

```

**Main Code**

```

1 function [X, Y1, Y2] = solver(a, b, N)
2
3 % Defining step size
4 h = (b-a)/N;
5
6 X = zeros(1, N);
7 Y1 = zeros(1, N);
8 Y2 = zeros(1, N);
9
10 % Initial Values
11 Y1(1) = 2;
12 Y2(1) = 4;
13
14 for i = 1:N-1
15 % increasing X with step value
16 X(i+1) = X(i) + h;
17 % Calculating derivative for Y calculation
18 [f1, f2] = derivative(X(i), Y1(i), Y2(i));
19
20 % Next value of Y1
21 Y1(i+1) = Y1(i) + (h*f1);
22 % Next value of Y2
23 Y2(i+1) = Y2(i) + (h*f2);
24
25 end
26 return

```

**Algorithm**

Workspace

| Name    | Value          |
|---------|----------------|
| a       | 0              |
| b       | 4              |
| eps     | 1.0000e-03     |
| i       | 16             |
| j       | 5              |
| N       | 32768          |
| X       | 1x32768 double |
| Y1      | 1x32768 double |
| Y1_conv | 0              |
| Y1_pre  | 1x32768 double |
| Y2      | 1x32768 double |
| Y2_conv | 0              |
| Y2_pre  | 1x32768 double |

UTF-8

script

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Col 1