Software Packages | Euler Method

Assignment_03

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Question: Write the matlab code for Euler Method and solve the first order ODE with given initial value by using euler method (numerical procedure).

$$n = 10$$

$$dy/dx = sin(xy), \qquad y(0) = \pi$$

in the given interval $x \epsilon [0, 1]$.

Solution:

step size (h) => $\Delta x = \frac{x_n - x_0}{n}$

```
h = (1-0)/10; % step size
x=0:h:1; % range of x
y=zeros(size(x)); % allocate the result y
y(1)=pi; % initial value of y
n=numel(y); % number of y values

for i = 1:n-1
    dydx = sin(x(i)*y(i));
    y(i+1) = y(i) + dydx*h;
    fprintf('="Y"\n\t   %0.01f', y(i));
end
```

```
="Y"
    3.1="Y"
    3.1="Y"
    3.2="Y"
    3.2="Y"
    3.3="Y"
    3.4="Y"
    3.5="Y"
    3.6="Y"
    3.7="Y"
    3.7
```

```
%%fprintf('="Y"\n\t   %0.01f',y);

% Plotting with labels, title, legend, and markers
figure;
plot(x, y, '-o', 'LineWidth', 2, 'MarkerSize', 8, 'MarkerFaceColor', 'g');
```

```
grid on;
xlabel('x');
ylabel('y');
title('Numerical Solution of dy/dx = sin(xy) using Euler''s Method');
legend('Euler''s Method', 'Location', 'Best');
```