

Example (1): Use Euler's method to solve approximately the initial value problem

$$\frac{dy(x)}{dx} = x - y, \quad y(0) = 1$$

At the values $x=0.1, 0.2, 0.3, 0.4$

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% Euler Method to solve an IVP of the first
order.
clear;clc;
a=0;
b=0.4;
n=4;
y0=1;
f=@(x,y) x-y;
h=(b-a)/n;
y=zeros(1,n+1);
x=zeros(1,n+1);
x(1)=a;
y(1)=y0;
for k=1:n
    x(k+1)=x(k)+h;
    y(k+1)=y(k)+h*f(x(k),y(k));
end
disp('      x      y ')
disp('  -----  -----')
disp([x' y'])
```

x	y
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0	1.0000
0.1000	0.9000
0.2000	0.8200
0.3000	0.7580
0.4000	0.7122