

MATLAB highlighting in LaTeX documents

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1 MATLAB code demo

Euler method

```
1 % Euler method for the ODE model
2 % u'(x)=x^2+x-u, x in [0,1]
3 % Initial condition: u(0)=0 ;
4 % Exact solution: u(x)=-exp(-x)+x^2-x+1.
5 clear all; clf
6 h=0.1;
7 x=0:h:1;
8 N=length(x)-1;
9 u(1)=0; % initial value
10 fun=@(t,u) t.^2+t-u; % RHS
11
12 for n=1:N
13     u(n+1)=u(n)+h.*fun(x(n),u(n));
14 end
15
16 ue=-exp(-x)+x.^2-x+1; % exact solution
17 plot(x,ue,'b-',x,u,'r+', 'LineWidth',1)
18 legend('Exact','Numerical','location','North')
19 %title('Euler method','fontsize',12)
20 set(gca,'fontsize',12)
21 xlabel('x','fontsize',16), ylabel('u','fontsize',16,'Rotation',0)
```