

## Função: ODE45

Resolva  $y'(x) = 2y(x)\left(\frac{92 - y(x)}{92}\right)$   
em  $x \in [0, 3]$  com  $y(0) = 10$ ;  
visualize os valores de  $y(1)$ ,  $y(2)$ ,  $y(3)$ .

## Exemplo: ODE45

```
function dy=teste(x,y)
dy=2*y*(92-y)/92;
```

```
>> [x,y]=ode45('teste',[0,1,2,3],[10])% mostra y em 0,1,2 e 3
```

x =	y =
0	10.000000000000000
1	43.60727879109315
2	79.98712420367366
3	90.16728417740629

```
>> plot(x,y)
>> hold on;
>> [x,y]=ode45('teste',[0 3],[10])
>> plot(x,y,'r')
```

## Exemplo: ODE45

Resolva

$$\begin{cases} \frac{dx}{dt} = -\beta xy \\ \frac{dy}{dt} = \beta xy - \alpha y \\ \frac{dz}{dt} = \alpha y \end{cases}$$

em  $t \in [0, 10]$

$\alpha = 0.05$ ,  $\beta = 0.0002$ ,  $x(0) = 980$ ,  $y(0) = 20$ ,  $z(0) = 0$ ;

visualize os valores em 5 e 10.

```
function dy=teste(x,y)
dy=zeros(3,1);
dy(1)=-0.0002*y(1)*y(2);
dy(2)=0.0002*y(1)*y(2)-0.05*y(2);
dy(3)=0.05*y(2);
>> [x,y]=ode45('teste',[0,5,10],[980,20,0])
x = 0
    5
   10
y = 980.0000    20.0000         0
    951.6867    40.9841     7.3292
    897.2762    80.6766    22.0472
>> [x,y]=ode45('teste',[0 10],[980,20,0])
>> plot(x,y(:,1))
>> hold on;
>> plot(x,y(:,2),'r')
>> hold on;
>> plot(x,y(:,3),'g')
```