```
> read "DRStrelba.m":
```

Aplikaţní pŚíklad 3:

Axiální sdílení hmoty v trubkovém homogenním reaktoru, která je doprovázena reakcí 2. Śádu, je popsáno rovnicí

$$\frac{1}{Pe}\frac{d^2}{dx^2}y - \frac{d}{dx}y - p\,y^m T^{-m} e^{\left(K-\frac{R}{T}\right)} = 0, \text{ kde } T = 1 - H(1-y)$$

$$y(0) = 1 + \frac{1}{Pe}\frac{d}{dx}y(0), \quad \frac{d}{dx}y = 0.$$

Pouğijte parametry Pe = 10, p = 0.6, $K = 14.1$, $R = 10.85$, $H = 0.1437$, $m = 1$.

ř eğení

Definice parametrŢ diferenciální rovnice

```
> Pe:=10:
  p:=0.6:
  K:=14.1:
  R:=10.85:
  H:=0.1437:
  m:=1:
```

Definice pravé strany diferenciální rovnice

```
> f:=unapply(y2,x,y1,y2);
  g:=unapply(Pe*y2+Pe*p*y1^m*(1-H*(1-y1))^(-m)*exp(K-R/(1-H*(1
  -y1))),x,y1,y2);
```

$$f := (x, y1, y2) \rightarrow y2$$

$$g := (x, y1, y2) \rightarrow 10\,y2 + \frac{6.0\,y1\,e^{14.1 - \frac{10.85}{0.8563 + 0.1437\,y1}}}{0.8563 + 0.1437\,y1} \qquad \textbf{(1.1)}$$

Definice parametrŢ metody strelba2. Poznámka: integrujeme od 1.0 do 0.0

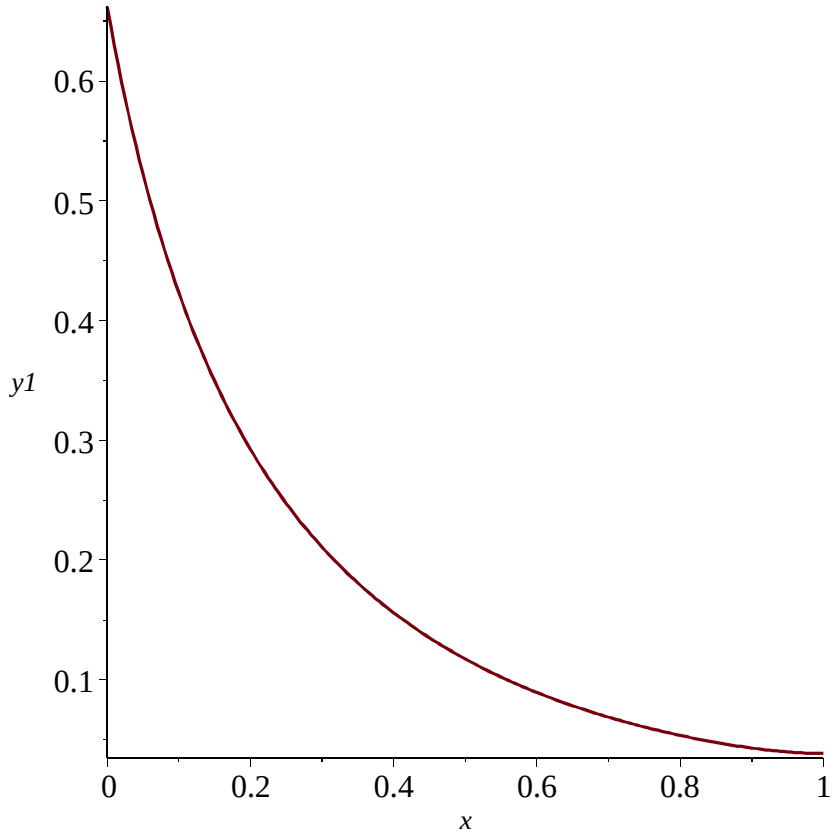
```
> a := 1.0:
  b := 0.0:
  alfa1 := 0:
  alfa2 := 1:
  beta2 := -1/Pe:
  beta1 := 1:
  gama1 := 0:
  gama2 := 1:
  eps := 0.1e-5:
  m1 := 10:
  h:=(b-a)/m1:
  z0:=0.05;
  Lx := evalf([seq(a+(i-1)*h, i = 1 .. m1+1)]):
```

$$z0 := 0.05 \qquad \textbf{(1.2)}$$

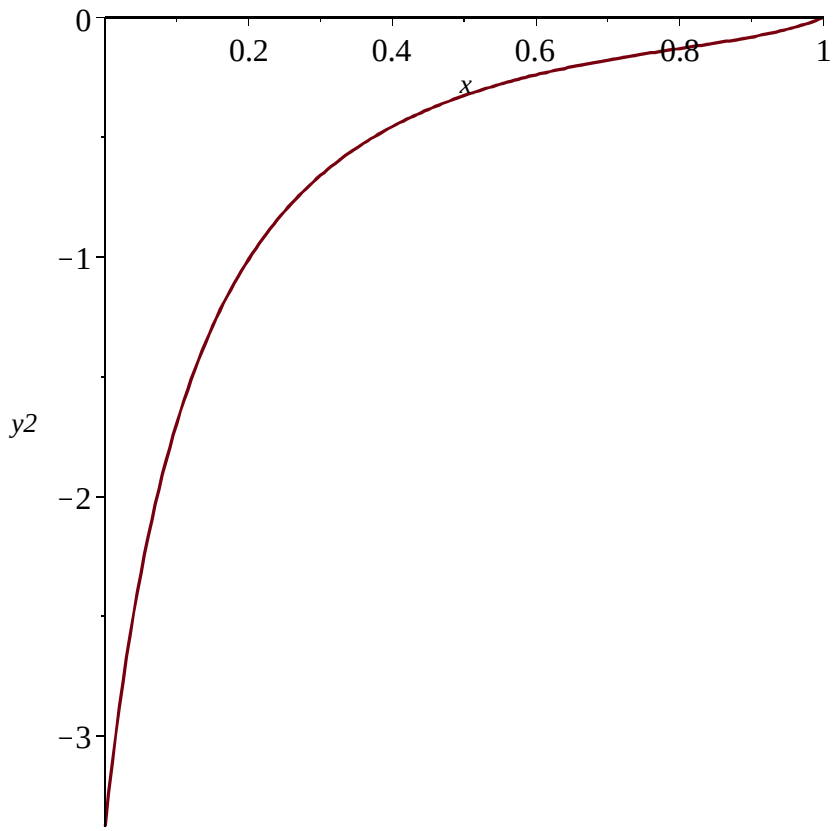
```
> v := Strelba2(f, g, a, b, alfa1,alfa2,beta1,beta2,gama1,
  gama2, eps, z0, Lx):
```

```
iterace        zn            sn
-------------------------------------
    0     0.050000000
    1     0.044066313     0.005933687
    2     0.039751033     0.004315280
    3     0.038499881     0.001251151
    4     0.038428148     0.000071733
    5     0.038427936     0.000000212
```

```
> # Graf funkce y1(x)
> v[1];
```




```
> # Graf funkce y2(x)
> v[2];
```




```
> linalg[matrix](v[3]);
```

1.0	0.0384281480299781
0.9000000000	0.0430037707584047
0.8000000000	0.0535855037872296
0.7000000000	0.0688133776289215
0.6000000000	0.0894354682667965
0.5000000000	0.117386619674337
0.4000000000	0.155971023784243
0.3000000000	0.210848863117736
0.2000000000	0.292533822400467
0.1000000000	0.423340252454629
0.	0.662258346636664

(1.3)

```
> # Tabulka hodnot funkce y2(x)
> linalg[matrix](v[4]);
```

$$\begin{bmatrix} 1.0 & 0. \\ 0.9000000000 & -0.0809334160244090 \\ 0.8000000000 & -0.128972065445391 \\ 0.7000000000 & -0.176948797947775 \\ 0.6000000000 & -0.238682366294420 \\ 0.5000000000 & -0.325696836004925 \\ 0.4000000000 & -0.455060291167862 \\ 0.3000000000 & -0.659064733480433 \\ 0.2000000000 & -1.00877800798053 \\ 0.1000000000 & -1.69217377185950 \\ 0. & -3.37755405210467 \end{bmatrix} \tag{1.4}$$