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

Aplikaţní pŚíklad 2:

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

$$\frac{1}{Pe}\frac{d^2}{dx^2}u - \frac{d}{dx}u - R\,u^2 = 0$$

$$u(0) - \frac{1}{Pe}\frac{d}{dx}u(0) = 1, \quad \frac{d}{dx}u(1) = 0$$

Pouģijte parametry Pe = 6, R = 2

ř eģení

Definice parametrŢ diferenciální rovnice

```
> Pe:=6:
  R:=2:
```

Definice pravé strany diferenciální rovnice

```
> f:=unapply(u2,x,u1,u2);
  g:=unapply(Pe*u2+Pe*R*u1^2,x,u1,u2);
```

$$f := (x, u1, u2) \rightarrow u2$$

$$g := (x, u1, u2) \rightarrow 12\,u1^2 + 6\,u2 \qquad \textbf{(1.1)}$$

Definice parametrŢ metody

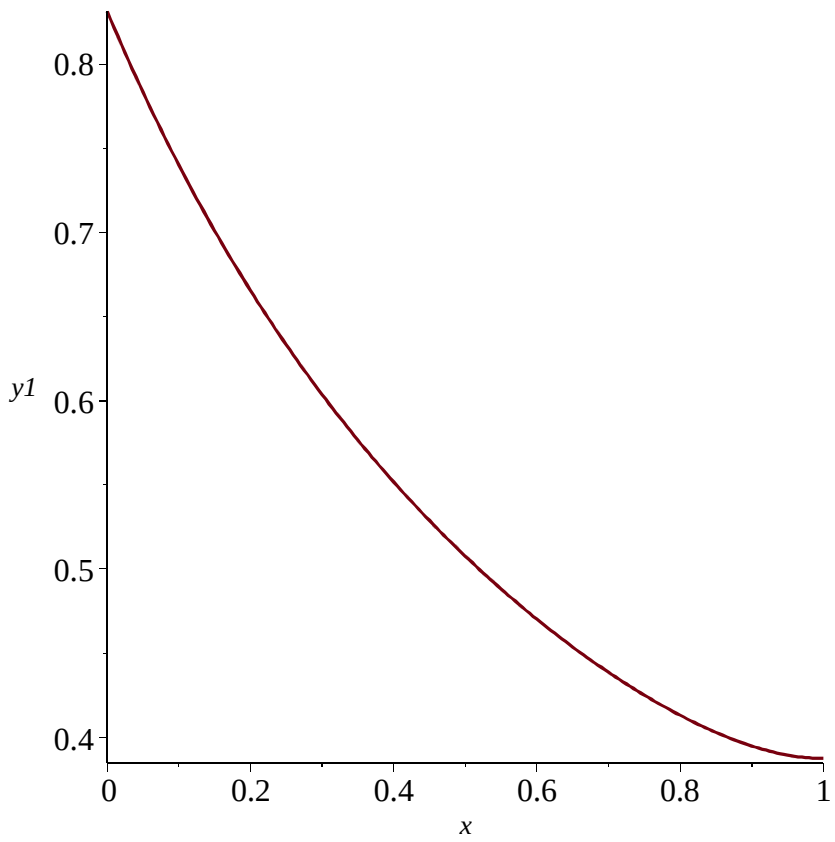
```
> a := 0:
  b := 1:
  alfa1 := 1:
  alfa2 := 0:
  beta1 := -1/Pe:
  beta2 := 1:
  gama1 := 1:
  gama2 := 0:
  eps := 0.1e-4:
  m := 10:
  h:=(b-a)/m:
  z0:=0.8;
  Lx := evalf([seq(a+(i-1)*h, i = 1 .. m+1)]):
```

$$z0 := 0.8 \qquad \textbf{(1.2)}$$

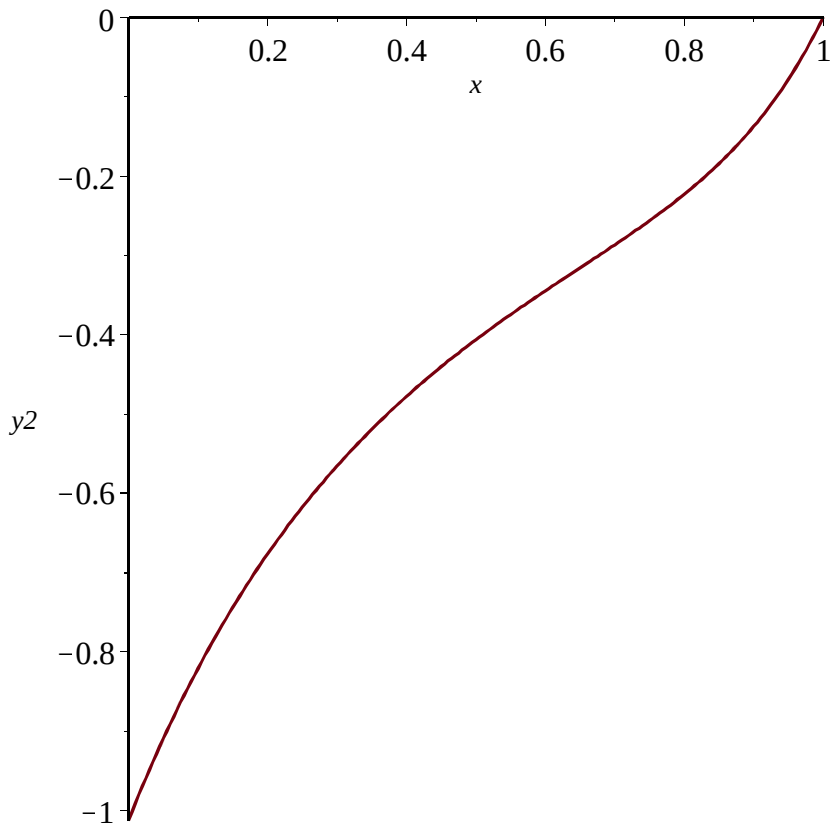
```
> v := Strelba2(f, g, a, b, alfa1,alfa2,beta1,beta2,gama1,
  gama2, eps, z0, Lx):
```

```
iterace        zn           sn
-------------------------------------
    0     0.800000000
    1     0.837293057     0.037293057
    2     0.835894054     0.001399003
    3     0.834438295     0.001455758
    4     0.833080304     0.001357991
    5     0.832026207     0.001054097
    6     0.831450429     0.000575778
    7     0.831299364     0.000151065
    8     0.831290325     0.000009039
```

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




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




```
> # Tabulka hodnot funkce y1(x)
> linalg[matrix](v[3]);
```

0.	0.831299363917083
0.1000000000	0.740134976505813
0.2000000000	0.665620532226356
0.3000000000	0.603794387344903
0.4000000000	0.551897387274521
0.5000000000	0.508033283357585
0.6000000000	0.471021564513965
0.7000000000	0.440436411629850
0.8000000000	0.416903728735452
0.9000000000	0.402851312489622
1.	0.404147165776511

(1.3)

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

$$
\begin{bmatrix}
0. & -1.01220381649750 \\
0.1000000000 & -0.820541451550635 \\
0.2000000000 & -0.676252237584963 \\
0.3000000000 & -0.564814457441030 \\
0.4000000000 & -0.476261596559307 \\
0.5000000000 & -0.402992939123916 \\
0.6000000000 & -0.337996402203586 \\
0.7000000000 & -0.272779110424963 \\
0.8000000000 & -0.194080836769348 \\
0.9000000000 & -0.0777222118281552 \\
1. & 0.123816887398600
\end{bmatrix} \tag{1.4}
$$