```
Get[FileNameJoin[{NotebookDirectory[], "DeStrelba.wl"}]]
```

Aplikační příklad 4

Apl. příklad 4: Mějme rovnici popisující neizotermní vnitřní difuzi v částici katalyzátoru tvaru desky

$\frac{\partial^2 y}{\partial x^2} = \phi^2 \, y \, e^{\left(\frac{\alpha\beta(1-y)}{1+\beta(1-y)}\right)}$,

$\frac{\partial y}{\partial x}(0) = 0, \; y(1) = 1.$

Použijte parametry α=20, β=0.1, ϕ=1.

Definice parametrů diferenciální rovnice

```
α = 20;
β = 0.1;
ϕ = 1;
```

Definice pravé strany diferenciální rovnice

```
f[x_, y1_, y2_] = y2;
g[x_, y1_, y2_] = ϕ^2 y1 Exp[(α β (1 - y1)) / (1 + β (1 - y1))];
```

Parametry programu Strelba1/Strelba2

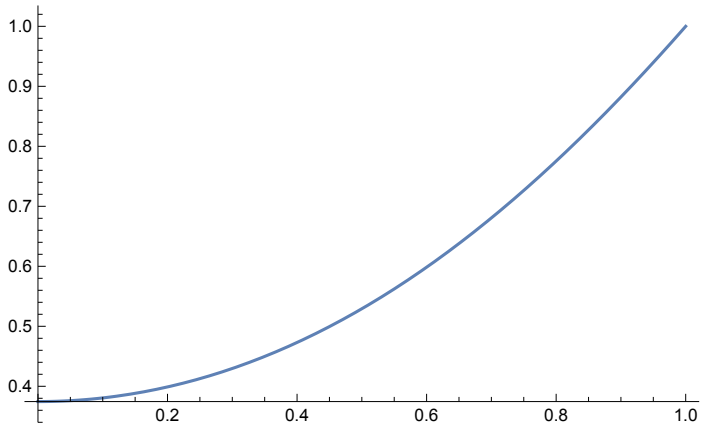
```
a = 0.0;
b = 1.0;
α1 = 0;
α2 = 1;
β1 = 1;
β2 = 0;
γ1 = 0;
γ2 = 1;
ϵ = 0.000001;
h = 0.001;
z0 = 1.0;
m = 10;
Lx = Table[N[a + i (b - a) / m], {i, 0, m}];
```

```
v = Strelba1[f, g, a, b, α1, α2, β1, β2, γ1, γ2, ϵ, h, z0, Lx];
```

i	z	s
0	1.	
1	0.147427	0.852573
2	0.301747	0.15432
3	0.367308	0.0655603
4	0.374472	0.00716434
5	0.374533	0.0000614417
6	0.374533	7.849×10^{-8}

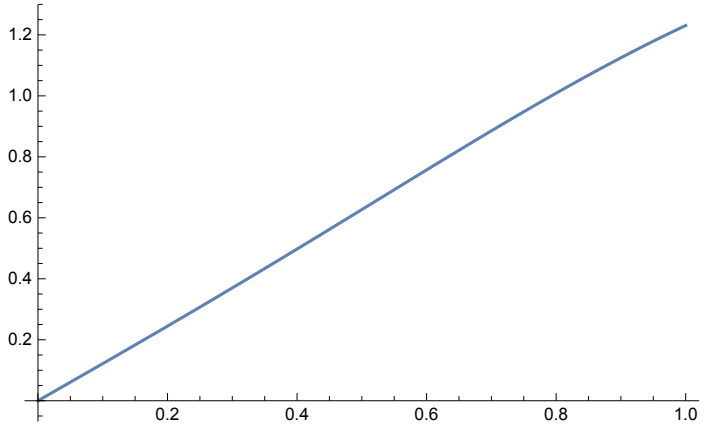
Graf řešení $y_1(x)$

```
v[[1]]
```



Graf řešení $y_2(x)$

```
v[[2]]
```



Tabulka řešení $y_1(x)$

```
MatrixForm[v[[3]]]
```

0.	0.374533
0.1	0.380617
0.2	0.398931
0.3	0.429648
0.4	0.473007
0.5	0.52923
0.6	0.598444
0.7	0.680589
0.8	0.775349
0.9	0.882117
1.	1.

Tabulka řešení $y_2(x)$

```
MatrixForm[v[[4]]]
```

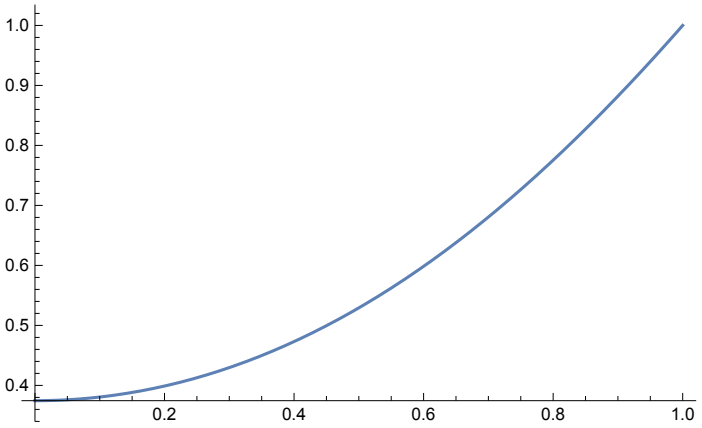
0.	0.
0.1	0.121777
0.2	0.244796
0.3	0.369969
0.4	0.497586
0.5	0.627107
0.6	0.757091
0.7	0.885287
0.8	1.0089
0.9	1.12496
1.	1.23081

```
v = Strelba2[f, g, a, b, α1, α2 , β1, β2 , γ1 , γ2 , ϵ, z0, Lx];
```

i	z	s
0	1.	
1	0.147468	0.852532
2	0.301445	0.153978
3	0.367145	0.0656996
4	0.374459	0.00731387
5	0.374533	0.000074432
6	0.374533	7.60543×10^{-9}

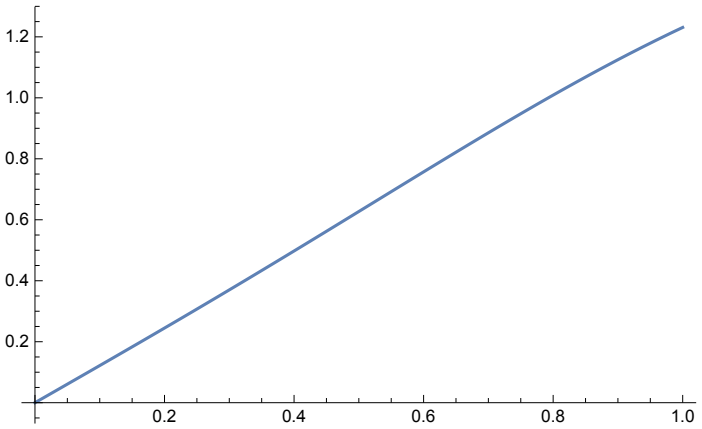
Graf řešení y_1(x)

```
v[[1]]
```



Graf řešení y_2(x)

```
v[[2]]
```



Tabulka řešení $y_1(x)$

```
MatrixForm[v[[3]]]
```

0.	0.374533
0.1	0.380617
0.2	0.39893
0.3	0.429648
0.4	0.473007
0.5	0.52923
0.6	0.598444
0.7	0.680589
0.8	0.775349
0.9	0.882117
1.	1.

Tabulka řešení $y_2(x)$

```
MatrixForm[v[[4]]]
```

0.	0.
0.1	0.121777
0.2	0.244796
0.3	0.369969
0.4	0.497586
0.5	0.627107
0.6	0.757091
0.7	0.885287
0.8	1.0089
0.9	1.12496
1.	1.23081