In[1]:=
```
Get[FileNameJoin[{NotebookDirectory[], "DeSite.wl"}]]
```

Aplikační příklad 2

Apl. příklad 2: Axiální sdílení hmoty v trubkovém homogenním reaktoru, která je doprovázena reakcí 2. řádu, je popsáno rovnicí

$$\frac{1}{\mathrm{Pe}}\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial x} - \mathrm{R}\ u^2 = 0$$

$$u(0) - \frac{1}{\mathrm{Pe}}\frac{\partial u}{\partial x}(0) = 1, \quad \frac{\partial u}{\partial x}(1) = 0.$$

Použijte parametry Pe=6, R=2

Definice parametrů diferenciální rovnice

In[2]:=
```
Pe = 6;
R = 2;
```

Definice pravé strany diferenciální rovnice

In[4]:=
```
f[x_, u1_, u2_] = Pe * u2 + Pe * R * u1^2;
```

Parametry programu Strelba1/Strelba2

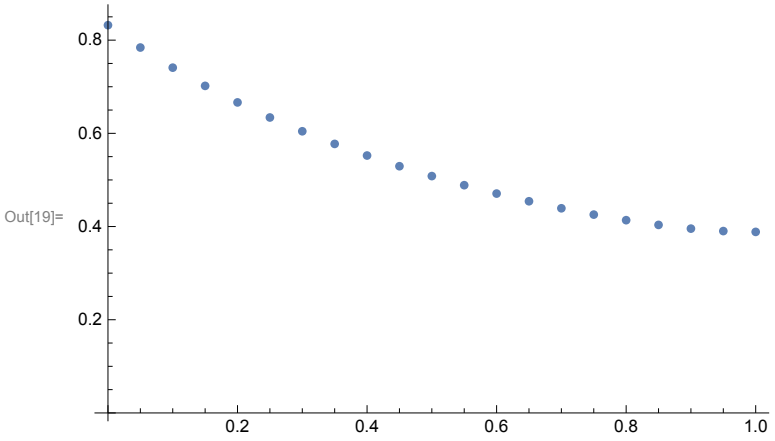
In[5]:=
```
a = 0;
b = 1.0;
α1 = 1;
α2 = 0;
β1 = -1 / Pe;
β2 = 1;
γ1 = 1;
γ2 = 0;
ϵ = 0.000001;
n = 20;
u0 = Table[0.5, {i, 1, n + 1}];
u0[[1]] = 1.0;
u0[[n + 1]] = 1.0;
```

In[18]:=
```
ures = DESite2[n, f, a, b, α1, α2 , β1, β2 , γ1 , γ2 , ϵ, u0, 10];
```

```
iterace = 0

y={0.583333, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5,
  0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5}

iterace = 1     s = 0.276083

y={0.84382, 0.798683, 0.75698, 0.718453, 0.682862, 0.649986,
  0.619625, 0.591593, 0.565724, 0.541868, 0.519893, 0.499688, 0.481164,
  0.464261, 0.448954, 0.435267, 0.423288, 0.413198, 0.405306, 0.40011, 0.398378}

iterace = 2     s = 0.0217804

y={0.832167, 0.784202, 0.741004, 0.701932, 0.666449, 0.634109,
  0.604538, 0.577421, 0.552493, 0.529535, 0.508365, 0.488841, 0.470855, 0.454342,
  0.439283, 0.425717, 0.413756, 0.403613, 0.395635, 0.390364, 0.388607}

iterace = 3     s = 0.000179121

y={0.832126, 0.784147, 0.740938, 0.701854, 0.666361, 0.634014,
  0.604437, 0.577316, 0.552386, 0.529426, 0.508256, 0.488731, 0.470745, 0.454232,
  0.439173, 0.425607, 0.413646, 0.403502, 0.395524, 0.390252, 0.388495}

iterace = 4     s = 1.135×10^-8

y={0.832126, 0.784147, 0.740938, 0.701854, 0.666361, 0.634014,
  0.604437, 0.577316, 0.552386, 0.529426, 0.508256, 0.488731, 0.470745, 0.454232,
  0.439173, 0.425607, 0.413646, 0.403502, 0.395524, 0.390252, 0.388495}
```

Graf řešení *u*(x)

```
In[19]:= ListPlot[ures]
```



Tabulka řešení *u*(x)

In[20]:=
```
MatrixForm[ures]
```

Out[20]//MatrixForm=

0.	0.832126
0.05	0.784147
0.1	0.740938
0.15	0.701854
0.2	0.666361
0.25	0.634014
0.3	0.604437
0.35	0.577316
0.4	0.552386
0.45	0.529426
0.5	0.508256
0.55	0.488731
0.6	0.470745
0.65	0.454232
0.7	0.439173
0.75	0.425607
0.8	0.413646
0.85	0.403502
0.9	0.395524
0.95	0.390252
1.	0.388495