

Aplikační příklad 1.2

Pravá strana soust. diferenciálních rovnic a variačních rovnic

```
function dy = ap1_var2(x,y)

dy = zeros(size(y));

a = 2; n = 1; phi = 1;
dy(1) = y(2);
if (abs(x)<1e-8)
    dy(2)=1/(1+a)*phi^2*y(1)^n;
else
    dy(2) = -a/x*y(2) + phi^2*y(1)^n;
end
dy(3) = y(4);
if (abs(x)<1e-8)
    dy(4) = 1/(1+a)*phi^2*n*y(1)^(n-1)*y(3);
else
    dy(4) = phi^2*n*y(1)^(n-1)*y(3) - a/x*y(4);
end
end
```

```

% 1/Pe * u'' - u' - R * u^2 = 0,
% u(0) - 1/Pe * u'(0) = 1,
% u'(1) = 0

% Pe = 6, R = 2
Pe = 6;

a = 0;
b = 1;

alpha1 = 1;
alpha2 = 0;
beta1 = -1/Pe;
beta2 = 1;
gamma1 = 1;
gamma2 = 0;

eps = 1e-6;
maxiter = 100;
Lx = linspace(a,b,20);

eta_0 = 0.6;
[u, eta] = MetodaStrelby(@ap2_var,a,b,alpha1,alpha2,beta1,beta2,gamma1,gamma2,eta_0,eps,maxiter,Lx);

if (~isempty(u))
    figure
    plot (Lx, u(:,1))
    title('Axialni sdileni hmoty v trubkovem homogennim reaktoru')
    xlabel('x')
    ylabel('u(x)')
end

```

```

k = 0, eta = 6.000000000e-01
k = 1, eta = 6.24628045e-01, delta = 2.46280447e-02
k = 2, eta = 6.54208856e-01, delta = 2.95808114e-02
k = 3, eta = 6.88380181e-01, delta = 3.41713252e-02
k = 4, eta = 7.25924556e-01, delta = 3.75443742e-02
k = 5, eta = 7.65028301e-01, delta = 3.91037455e-02
k = 6, eta = 8.05680073e-01, delta = 4.06517718e-02
k = 7, eta = 8.35237637e-01, delta = 2.95575645e-02
k = 8, eta = 8.33802770e-01, delta = 1.43486730e-03
k = 9, eta = 8.32554791e-01, delta = 1.24797862e-03
k = 10, eta = 8.31702801e-01, delta = 8.51990137e-04
k = 11, eta = 8.31345705e-01, delta = 3.57096525e-04
k = 12, eta = 8.31291465e-01, delta = 5.42402178e-05
k = 13, eta = 8.31290340e-01, delta = 1.12465759e-06
k = 14, eta = 8.31290339e-01, delta = 4.73981299e-10
Reseni:

```

x	y(x)
0.000,	0.831290
0.053,	0.780928
0.105,	0.735821
0.158,	0.695225
0.211,	0.658530

0.263,	0.625229
0.316,	0.594903
0.368,	0.567200
0.421,	0.541829
0.474,	0.518551
0.526,	0.497173
0.579,	0.477547
0.632,	0.459574
0.684,	0.443205
0.737,	0.428457
0.789,	0.415426
0.842,	0.404318
0.895,	0.395490
0.947,	0.389513
1.000,	0.387258

