Aplikační příklad 1.5

Pravá strana soustavy diferenciálních rovnic a variačních rovnic

```
function dy = ap5_var(x,y)

dy = zeros(size(y));

delta = 0.87845;

dy(1) = y(2);
dy(2) = -delta * exp(y(1));
dy(3) = y(4);
dy(4) = -delta * exp(y(1)) * y(3);

end
```

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Vlastní výpočet metodou střelby

```
% theta''= -delta * exp(theta) ,
% theta'(0)=0, theta(1)=0
% delta = 0.87845 (pro vetsi delta reseni neexistuje)

a = 0;
b = 1;

alpha1 = 0;
alpha2 = 1;
beta1 = 1;
beta2 = 0;
gamma1 = 0;
gamma2 = 0;

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

eta_0 = 1.0;
[y, eta] = MetodaStrelby(@ap5_var,a,b,alpha1,alpha2,beta1,beta2,gamma1,gamma2,eta_0,eps,maxiter,Lx);

if (~isempty(y))
    figure
    plot (Lx, y(:,1))
    title('Exotermni reakce u explozivnich materialu')
    xlabel('x')
    ylabel('y(x)')
end
```

```
k = 0, eta =   1.00000000e+00
k = 1, eta =   1.09487262e+00, delta =   9.48726203e-02
k = 2, eta =   1.14108650e+00, delta =   4.62138823e-02
k = 3, eta =   1.16378883e+00, delta =   2.27023284e-02
k = 4, eta =   1.17481333e+00, delta =   1.10245035e-02
k = 5, eta =   1.17982788e+00, delta =   5.01454473e-03
k = 6, eta =   1.18161198e+00, delta =   1.78409674e-03
k = 7, eta =   1.18191518e+00, delta =   3.03207408e-04
k = 8, eta =   1.18192448e+00, delta =   9.30099226e-06
k = 9, eta =   1.18192449e+00, delta =   8.77456396e-09
Reseni:
   x      y(x)
0.000,   1.181924
0.053,   1.177960
0.105,   1.166098
0.158,   1.146430
0.211,   1.119110
0.263,   1.084342
0.316,   1.042381
0.368,   0.993522
0.421,   0.938093
0.474,   0.876448
0.526,   0.808958
0.579,   0.736003
0.632,   0.657969
```

```
0.684,   0.575236
0.737,   0.488176
0.789,   0.397149
0.842,   0.302502
0.895,   0.204560
0.947,   0.103630
1.000,  -0.000000
```