```
> read "PDEParabImpl.m":
```

Apl. pŠíklad 1:

Nestacionární sdílení hmoty v porézním katalyzátoru ve tvaru kuliļky, ve kterém probíhá reakce 1. Šádu, je popsána rovnicí

$$\frac{\partial}{\partial t} y = \frac{\partial^2}{\partial x^2} y + \frac{2}{x} \frac{\partial}{\partial x} y - \phi^2 y$$

s okrajovými podmínkami $\frac{\partial}{\partial x} y(0,t) = 0$ a $y(1,t) = 1$ a poļáteļní podmínkou $y(x,0) = 0$ (nekonzistentní podmínky).

ř eģte pro ◖=2. Pro x=0 pŠepis rovnice na $\frac{\partial}{\partial t} y = 3\frac{\partial^2}{\partial x^2} y - \phi^2 y$.

```
> Phi:=2:
  F:=x->0.0;
```

$$F := x \rightarrow 0. \qquad \textbf{(1)}$$

Definice pravé strany diferenciální rovnice

```
> g:=(x,t)->piecewise(x=0,3.0,1.0);
  e:=(x,t)->piecewise(x=0,0.0,2/x);
  f:=(x,t,y)->-Phi^2* y;
```

$$g := (x, t) \rightarrow piecewise(x = 0, 3.0, 1.0)$$

$$e := (x, t) \rightarrow piecewise\left(x = 0, 0., \frac{2}{x}\right)$$

$$f := (x, t, y) \rightarrow -\Phi^2 y \qquad \textbf{(2)}$$

Definice parametrŢ metody

```
> a := 0.0:
  b := 1.0:
  alfa1 := 0.0:
  alfa2 := 1.0:
  beta1 := t->1.0:
  beta2 := t->0.0:
  gama1 := t->0:
  gama2 := t->1:

> n :=  10;
  h :=(b-a)/n;
> m :=  100;
> k := 0.01;
  T := k*m;
> vys:=PDEParabImpl(n,m,k,a, b, g, e,f,alfa1,beta1,alfa2,beta2,
  gama1,gama2,F):
```

$$n := 10$$

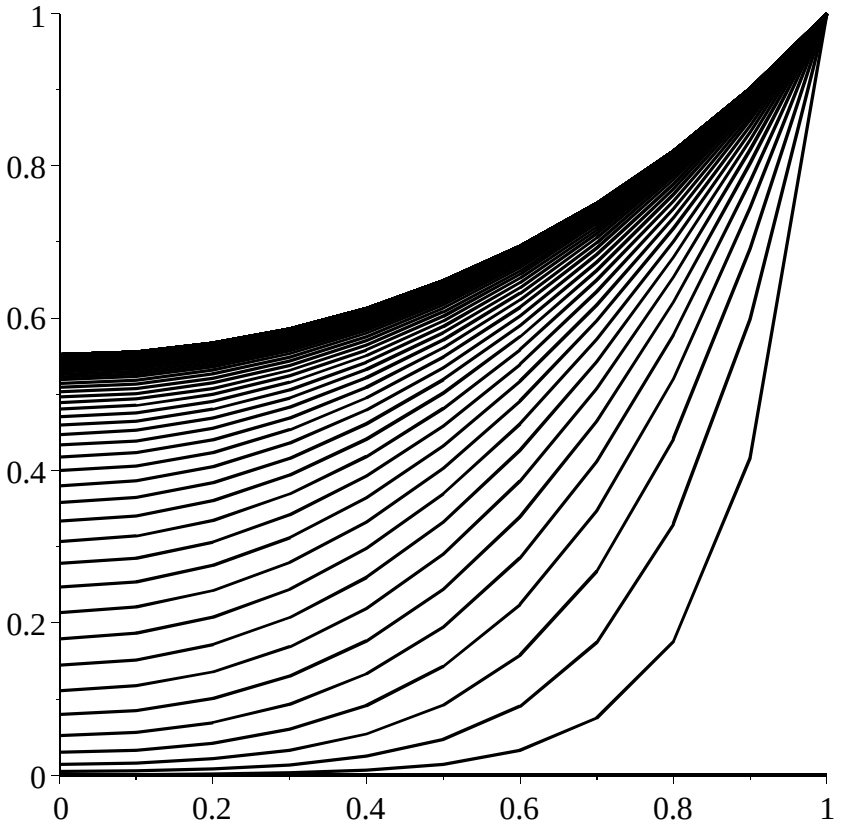
$$h := 0.1000000000$$

$$m := 100$$

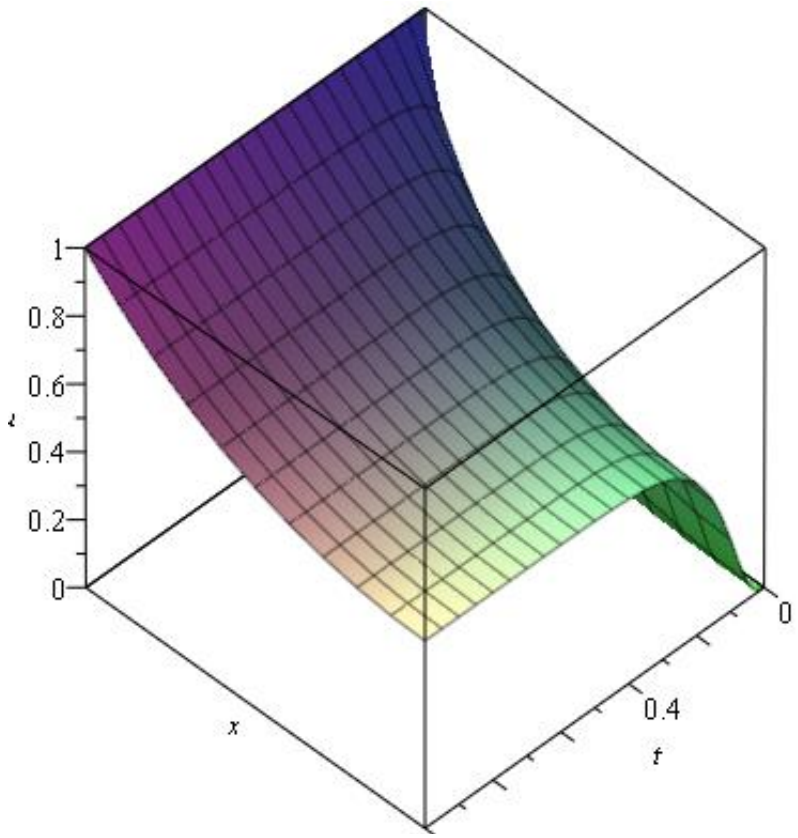
$$k := 0.01$$

$$T := 1.00 \qquad \textbf{(3)}$$

```
> data := [seq([seq([0 + (i-1) * h, vys[j, i]], i = 1 .. n + 1)], j = 1 .. m + 1)]:
> with(plots):
  display(seq(listplot(data[i]), i = 1 ..m));
```




```
> a := subs(1 .. m + 1 = 0 ..T, 1 .. n + 1 = 0 .. 1, matrixplot(vys[1 .. m + 1, 1 .. n + 1], labels
      = [t, x, u])) :
  display(a, view = [0 .. T, 1 .. 0, 0 .. 1])
```


1
0.8
0.6
0.4
0.2
0
x
0.4
t
0