```
PDEParabImpl := proc (n, m, k, a, b, g, e, f, alfa1, beta1, alfa2, beta2, gama1, gama2, phi)
    local h, n1, m1, u, i, j, alfa, beta, x, F, d1, d2, d3, p, q, r, s, pom, up, df;
    with(linalg);
    h := (b-a) / n;
    n1 := n + 1;
    m1 := m + 1;
    alfa := evalf(k / (h * h) );
    beta := evalf(k / (2 * h) );
    df := D[3](f);
    x := Vector(n1, i → a + (i-1) * h);
    u := Matrix( (m1, n1), 0);
    d1 := Vector(n-1, 0);
    d2 := Vector(n-1, 0);
    d3 := Vector(n-1, 0);
    F := Vector(n-1, 0);
    #profil u - 0 vrstva
    for i from 1 to n1 do
        u[1, i] := evalf(phi(x[i]) );
    end do;
    #Výpoļ et diagonál v matici A a pravé strany, u(j+1)=F(j)+A*u(j)
    for j from 1 to m do
        for i from 1 to n-1 do
            d1[i] := -evalf(g(x[i + 1], j * k) * alfa- e(x[i + 1], j * k) * beta);
            d2[i] := evalf(1 + 2 * alfa * g(x[i + 1], j * k) - k * df(x[i + 1], j * k, u[j, i + 1]) );
            d3[i] := -evalf(g(x[i + 1], j * k) * alfa + e(x[i + 1], j * k) * beta);
            F[i] := evalf(u(j, i + 1) - (k * df(x[i + 1], j * k, u[j, i + 1]) ) * u[j, i + 1] + k
   * f(x[i + 1], j * k, u[j, i + 1]) );
        end do;
        # Dosezení okrajových podmínek do první a poslední rovnice
        p := 1 / (alfa1 * 2 * h-3 * beta1(j * k) );
        r := beta1(j * k) * p;
        pom := d1[1] * r;
        d2[1] := d2[1]-4 * pom;
        d3[1] := d3[1] + pom;
        F[1] := F[1]-2 * h * gama1(j * k) * d1[1] * p;
        q := 1 / (alfa2 * 2 * h + 3 * beta2(j * k) );
        s := beta2(j * k) * q;
        pom := d3[n-1] * s;
        d2[n-1] := d2[n-1] + 4 * pom;
        d1[n-1] := d1[n-1]-pom;
        F[n-1] := F[n-1]-2 * h * gama2(j * k) * d3[n-1] * q;
        # Výpoļ et profilu u - j+1 vrstva, tj. pro t=j*k
        up := TriDiagonalSolve(n-1, d1, d2, d3, F);
        for i from 2 to n do
            u[j + 1, i] := up[i-1];
        end do;
        # výpoļ et okrajových podmínek - j+1 vrstva, tj. pro t=j*k
        u[j + 1, 1] := 2 * h * gama1(j * k) * p-r * (4 * u[j + 1, 2]-u[j + 1, 3]);
        u[j + 1, n1] := 2 * h * gama2(j * k) * q + s * (4 * u[j + 1, n]-u[j + 1, n-1]);
    end do;
    RETURN(eval(u) );
end proc:
```

PŚíklad 1:

```
phi := x→sin(evalf(Pi·x)) :
alfa1 := 1 :
 beta1 := t→0 :
alfa2 := 1 :
 beta2 := t→0 :
gama1 := t→0 :
 gama2 := t→0 :
g := (x, t)→1 :
 e := (x, t)→0 :
f := (x, t, y)→0 :
 n := 10 :
m := 80 :
 k := 0.005 :
h := 1.0/n;
 T := k·m;
```

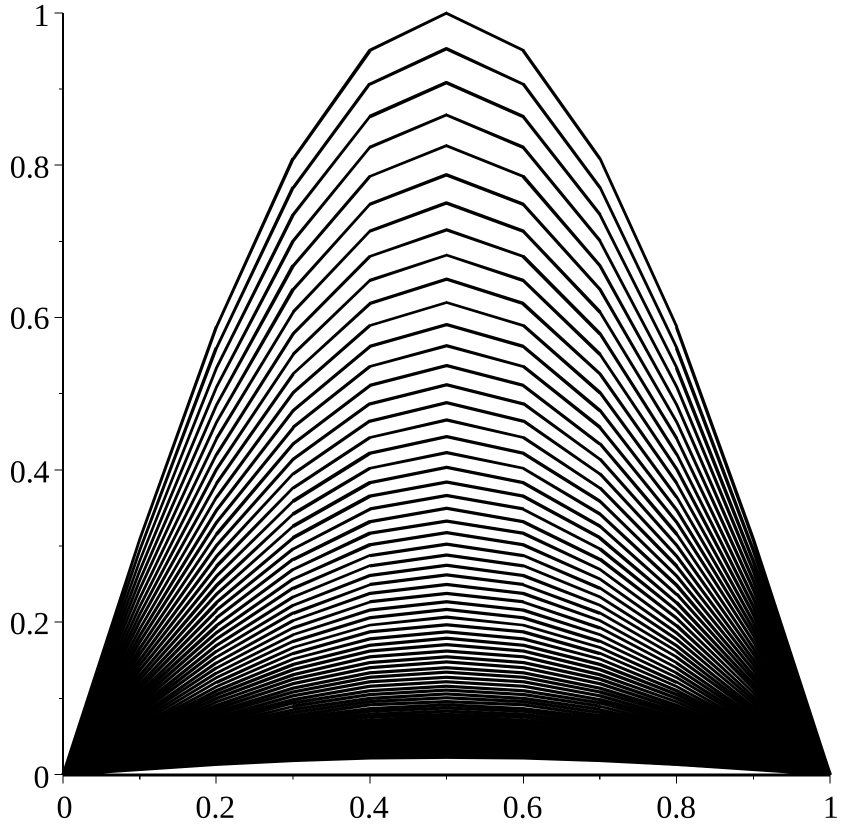
```
                              0.1000000000
                                 0.400                                  (1.1)
```

```
vys := PDEParabImpl(n, m, k, 0.0, 1.0, g, e, f, alfa1, beta1, alfa2, beta2, gama1, gama2, phi);
```

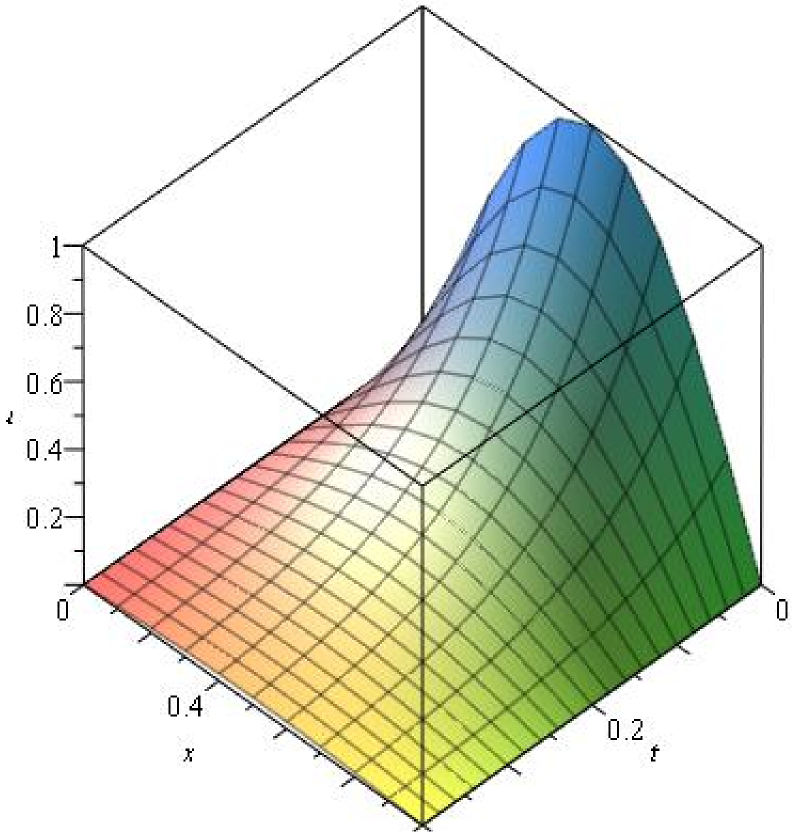
```
                         [ 81 x 11 Matrix          ]
                         [ Data Type: anything     ]
                         [ Storage: rectangular    ]                   (1.2)
                         [ Order: Fortran_order    ]
```

```
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, 0 .. 1, 0 .. 1]);
```


1
0.8
0.6
0.4
0.2
0
0.4
x
0
0.2
t