Condition Limite droite de Neumann discrétisée par un schéma centré:

> $restart : with(LinearAlgebra) :$

> $L := 15; H := 15; ndx := 3; ndy := 3;$

$$L := 15$$
$$H := 15$$
$$ndx := 3$$
$$ndy := 3$$

> $Tg := 0; Tb := 0; Th := 100; \alpha := 0$

$$Tg := 0$$
$$Tb := 0$$
$$Th := 100$$
$$\alpha := 0$$

> $\Delta x := \frac{L}{ndx}; \Delta y := \frac{H}{ndy}; \beta := \frac{\Delta x}{\Delta y}$

$$\Delta x := 5$$
$$\Delta y := 5$$
$$\beta := 1$$

> $i_{max} := ndx + 1;\ j_{max} := ndy + 1;$

$$i_{max} := 4$$
$$j_{max} := 4$$

> $N := (i_{max} - 2) \cdot (j_{max} - 2) + j_{max} - 2;$

$$N := 6$$

> **for** j **from** 2 **to** $j_{max} - 1$ **do** $T[1, j] := Tg$ **end do**;

$$T_{1, 2} := 0$$
$$T_{1, 3} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, 1] := Tb$ **end do**;

$$T_{2, 1} := 0$$
$$T_{3, 1} := 0$$
$$T_{4, 1} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, j_{max}] := Th$ **end do**;

$$T_{2, 4} := 100$$

$$T_{3,4} := 100$$

$$T_{4,4} := 100$$

```
k := 1 :
for j from 2 to j_max − 1 do
  for i from 2 to i_max -1 do
      Eq[k] := −2·(1 + β^2)·T[i, j] + T[i + 1, j] + T[i − 1, j] + β^2·(T[i, j + 1] + T[i, j − 1]) = 0 :
      Temps[k] := T[i, j] :
      k := k + 1 :
  end do:
  Eq[k] := -2·(1 + β^2)·T[i_max, j] + 2·T[i_max − 1, j] + β^2·(T[i_max, j − 1] + T[i_max, j + 1]) + 2·α·Δx = 0 :
  Temps[k] := T[i_max, j] :
  k := k + 1 :
end do:
```

> **for** k **from** 1 **to** N **do** $Eq[k]$ **end do**;

$$-4\ T_{2,2} + T_{3,2} + T_{2,3} = 0$$

$$-4\ T_{3,2} + T_{4,2} + T_{2,2} + T_{3,3} = 0$$

$$-4\ T_{4,2} + 2\ T_{3,2} + T_{4,3} = 0$$

$$-4\ T_{2,3} + T_{3,3} + 100 + T_{2,2} = 0$$

$$-4\ T_{3,3} + T_{4,3} + T_{2,3} + 100 + T_{3,2} = 0$$

$$-4\ T_{4,3} + 2\ T_{3,3} + T_{4,2} + 100 = 0$$

> $N := k - 1;$

$$N := 6$$

> $Eqs := \{seq(Eq[k], k = 1..N)\};$

$$Eqs := \{-4\ T_{2,2} + T_{3,2} + T_{2,3} = 0,\ -4\ T_{4,2} + 2\ T_{3,2} + T_{4,3} = 0,\ -4\ T_{2,3} + T_{3,3} + 100 + T_{2,2} = 0,\ -4\ T_{3,2} + T_{4,2} + T_{2,2} + T_{3,3} = 0,\ -4\ T_{4,3} + 2\ T_{3,3} + T_{4,2} + 100 = 0,\ -4\ T_{3,3} + T_{4,3} + T_{2,3} + 100 + T_{3,2} = 0\}$$

> $Tmps := [seq(Temps[k], k = 1..N)];$

$$Tmps := [T_{2,2}, T_{3,2}, T_{4,2}, T_{2,3}, T_{3,3}, T_{4,3}]$$

> $SolT := evalf(solve(Eqs, Tmps));$

$$SolT := [[T_{2,2} = 17.37373737,\ T_{3,2} = 25.75757576,\ T_{4,2} = 28.08080808,\ T_{2,3} = 43.73737374,\ T_{3,3} = 57.57575758,\ T_{4,3} = 60.80808081]]$$

> $Eqs := [seq(Eq[k], k = 1..N)];$

$$Eqs := [-4\,T_{2,2} + T_{3,2} + T_{2,3} = 0,\ -4\,T_{3,2} + T_{4,2} + T_{2,2} + T_{3,3} = 0,\ -4\,T_{4,2} + 2\,T_{3,2} + T_{4,3} = 0,\ -4\,T_{2,3} + T_{3,3} + 100 + T_{2,2} = 0,\ -4\,T_{3,3} + T_{4,3} + T_{2,3} + 100 + T_{3,2} = 0,\ -4\,T_{4,3} + 2\,T_{3,3} + T_{4,2} + 100 = 0]$$

> $M, R := GenerateMatrix(Eqs, Tmps)$

$$M, R := \begin{bmatrix} -4 & 1 & 0 & 1 & 0 & 0 \\ 1 & -4 & 1 & 0 & 1 & 0 \\ 0 & 2 & -4 & 0 & 0 & 1 \\ 1 & 0 & 0 & -4 & 1 & 0 \\ 0 & 1 & 0 & 1 & -4 & 1 \\ 0 & 0 & 1 & 0 & 2 & -4 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \\ -100 \\ -100 \\ -100 \end{bmatrix}$$

Tracé des Iso

```
> with(plottools) : with(plots) :
```

> $Schema5d := \mathbf{proc}(Tg, Nd, Tb, Th, NbIso)$

local $a, b, ndx, ndy, \Delta x, \beta, i, j, i_{max}, j_{max}, N, T, k, Eq, Temps, Eqs, Tmps, SolT, LT, Ns, GTemps, Iso, TMax, TMin, DeltaT;$

$a := 15 : b := 15 : ndx := 15 : ndy := 15 : \beta := 1. : i_{max} := ndx + 1 : j_{max} := \mathrm{ndy} + 1 : \Delta x := \dfrac{a}{ndx} :$

for j **from** 2 **to** $j_{max} - 1$ **do** $T[1, j] := Tg$ **end do**:

for i **from** 2 **to** $i_{max} - 1$ **do** $T[i, 1] := Tb$ **end do**:

for i **from** 2 **to** $i_{max} - 1$ **do** $T[i, j_{max}] := Th$ **end do**:

$T[1, 1] := \dfrac{Tg + Tb}{2} :$

$T[i_{max}, j_{max}] := Th :$

$T[i_{max}, 1] := Tb :$

$T[1, j_{max}] := \dfrac{Tg + Th}{2} :$

$k := 1 :$

for i **from** 2 **to** i_{max} -1 **do**

for j **from** 2 **to** $j_{max} - 1$ **do**

$Eq[k] := T[i+1, j] + T[i-1, j] + \beta^2 \cdot (T[i, j+1] + T[i, j-1]) - 2 \cdot (1 + \beta^2) \cdot T[i, j] = 0 :$

$Temps[k] := T[i, j] :$

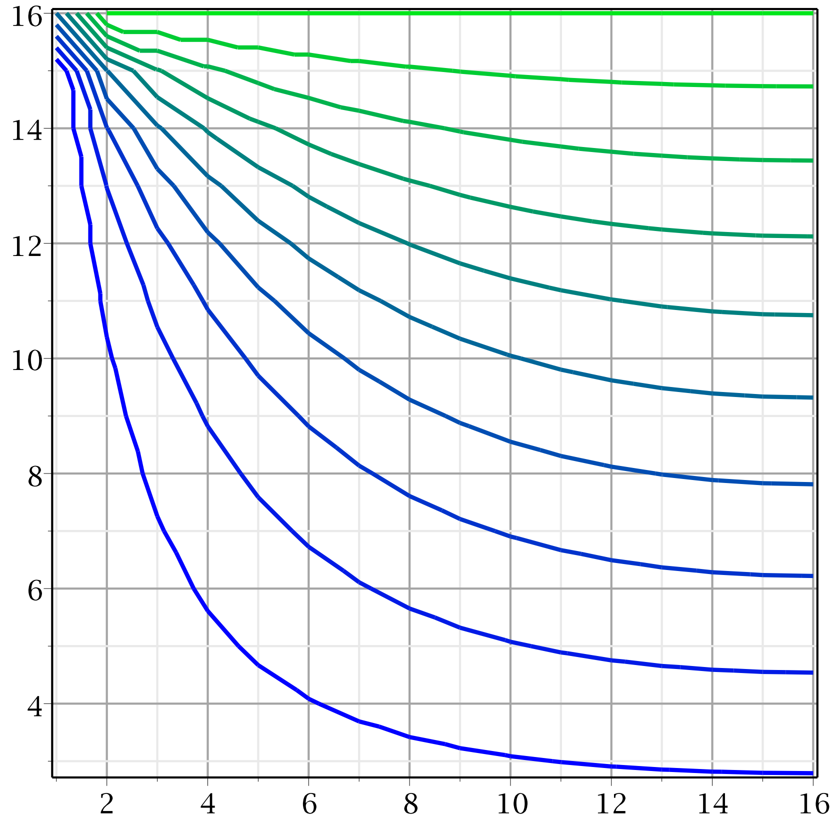
$k := k + 1 :$

end do:

```
end do:
for j from 2 to j_max − 1 do
Eq[k] := 2·(1 + β^2)·T[i_max, j] = 2·T[i_max − 1, j] + β^2·(T[i_max, j − 1] + T[i_max, j
      + 1]) + 2·Nd·Δx:
Temps[k] := T[i_max, j]:
 k := k + 1 :
 end do:
N := k − 1 :
Eqs := {seq(Eq[i], i = 1 ..N)} :
Tmps := [seq(Temps[i], i = 1 ..N)] :
SolT := solve(Eqs, Tmps) :
 k := 1 :
 for i from 2 to i_max do
  for j from 2 to j_max − 1 do
         T[i, j] := rhs(SolT_{1, k}) :
          k := k + 1 :
 end do:
end do:
GTemps := [seq([seq(T[i, j], j = 1 ..j_max)], i = 1 ..i_max)] :
TMax := max(seq(seq(T[i, j], j = 1 ..j_max), i = 1 ..i_max)) :
TMin := min(seq(seq(T[i, j], j = 1 ..j_max), i = 1 ..i_max)) :
DeltaT := evalf((TMax − TMin)/NbIso) :
 for k from 1 to NbIso do Iso[k] := k·DeltaT end do:
listcontplot(GTemps, axes = boxed, gridlines = true, thickness = 2, coloring
      = [blue, green], contours = [seq(Iso[k], k = 1 ..NbIso)], legend
      = [seq(convert(Iso[k], string), k = 1 ..NbIso)])
end proc:
```

Tracé des isothermes:

```
> Schema5d(0, 0, 0, 100, 10)
```



Condition Limite droite de Neumann discrétisée par un schéma décentré d'ordre 1:

> $restart: with(LinearAlgebra):$

> $L := 15; H := 15; ndx := 3; ndy := 3;$

$$L := 15$$
$$H := 15$$
$$ndx := 3$$
$$ndy := 3$$

> $Tg := 0; Tb := 0; Th := 100; \alpha := 0$

$$Tg := 0$$
$$Tb := 0$$
$$Th := 100$$
$$\alpha := 0$$

> $\Delta x := \frac{L}{ndx}$; $\Delta y := \frac{H}{ndy}$; $\beta := \frac{\Delta x}{\Delta y}$

$$\Delta x := 5$$
$$\Delta y := 5$$
$$\beta := 1$$

> $i_{max} := ndx + 1$; $j_{max} := ndy + 1$;

$$i_{max} := 4$$
$$j_{max} := 4$$

> $N := (i_{max} - 2) \cdot (j_{max} - 2)$;

$$N := 4$$

> **for** j **from** 2 **to** $j_{max} - 1$ **do** $T[1, j] := Tg$ **end do**;

$$T_{1,2} := 0$$
$$T_{1,3} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, 1] := Tb$ **end do**;

$$T_{2,1} := 0$$
$$T_{3,1} := 0$$
$$T_{4,1} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, j_{max}] := Th$ **end do**;

$$T_{2,4} := 100$$
$$T_{3,4} := 100$$
$$T_{4,4} := 100$$

> $k := 1$:
for j **from** 2 **to** $j_{max} - 1$ **do**
$T[i_{max}, j] := T[i_{max} - 1, j] + \alpha \cdot \Delta x$;

for i **from** 2 **to** i_{max} -1 **do**
$Eq[k] := -2 \cdot (1 + \beta^2) \cdot T[i, j] + T[i + 1, j] + T[i - 1, j] + \beta^2 \cdot (T[i, j + 1] + T[i, j-1]) = 0$:
$Temps[k] := T[i, j]$:
$k := k + 1$:
end do:
end do:

> **for** k **from** 1 **to** N **do** $Eq[k]$ **end do**;

$$-4\ T_{2,2} + T_{3,2} + T_{2,3} = 0$$

$$-3\,T_{3,2}+T_{2,2}+T_{3,3}=0$$
$$-4\,T_{2,3}+T_{3,3}+100+T_{2,2}=0$$
$$-3\,T_{3,3}+T_{2,3}+100+T_{3,2}=0$$

```
> N := k - 1;
```
$$N := 4$$

```
> Eqs := {seq(Eq[k], k = 1..N)};
```
$$Eqs := \{-4\,T_{2,2}+T_{3,2}+T_{2,3}=0,\ -3\,T_{3,2}+T_{2,2}+T_{3,3}=0,\ -4\,T_{2,3}+T_{3,3}+100+T_{2,2}=0,\ -3\,T_{3,3}+T_{2,3}+100+T_{3,2}=0\}$$

```
> Tmps := [seq(Temps[k], k = 1..N)];
```
$$Tmps := [T_{2,2}, T_{3,2}, T_{2,3}, T_{3,3}]$$

```
> SolT := evalf(solve(Eqs, Tmps));
```
$$SolT := [[T_{2,2}=16.84210526,\ T_{3,2}=24.21052632,\ T_{2,3}=43.15789474,\ T_{3,3}=55.78947368]]$$

```
> Eqs := [seq(Eq[k], k = 1..N)];
```
$$Eqs := [-4\,T_{2,2}+T_{3,2}+T_{2,3}=0,\ -3\,T_{3,2}+T_{2,2}+T_{3,3}=0,\ -4\,T_{2,3}+T_{3,3}+100+T_{2,2}=0,\ -3\,T_{3,3}+T_{2,3}+100+T_{3,2}=0]$$

```
> M, R := GenerateMatrix(Eqs, Tmps)
```
$$M, R := \begin{bmatrix} -4 & 1 & 1 & 0 \\ 1 & -3 & 0 & 1 \\ 1 & 0 & -4 & 1 \\ 0 & 1 & 1 & -3 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ -100 \\ -100 \end{bmatrix}$$

```
>
```

Condition Limite droite de Neumann discrétisée par un schéma décentré d'ordre 1 (Version2):

```
> restart: with(LinearAlgebra):
> L := 15; H := 15; ndx := 3; ndy := 3;
```
$$L := 15$$
$$H := 15$$
$$ndx := 3$$
$$ndy := 3$$

```
> Tg := 0; Tb := 0; Th := 100; α := 0
```
$$Tg := 0$$
$$Tb := 0$$

$$Th := 100$$

$$\alpha := 0$$

> $\Delta x := \frac{L}{ndx}$; $\Delta y := \frac{H}{ndy}$; $\beta := \frac{\Delta x}{\Delta y}$

$$\Delta x := 5$$

$$\Delta y := 5$$

$$\beta := 1$$

> $i_{max} := ndx + 1$; $j_{max} := ndy + 1$;

$$i_{max} := 4$$

$$j_{max} := 4$$

> $N := (i_{max} - 2) \cdot (j_{max} - 2)$;

$$N := 4$$

> **for** j **from** 2 **to** $j_{max} - 1$ **do** $T[1, j] := Tg$ **end do**;

$$T_{1,2} := 0$$

$$T_{1,3} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, 1] := Tb$ **end do**;

$$T_{2,1} := 0$$

$$T_{3,1} := 0$$

$$T_{4,1} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, j_{max}] := Th$ **end do**;

$$T_{2,4} := 100$$

$$T_{3,4} := 100$$

$$T_{4,4} := 100$$

> $k := 1$:
for j **from** 2 **to** $j_{max} - 1$ **do**
for i **from** 2 **to** i_{max} - 2 **do**
$Eq[k] := -2 \cdot (1 + \beta^2) \cdot T[i, j] + T[i + 1, j] + T[i - 1, j] + \beta^2 \cdot (T[i, j + 1] + T[i, j - 1]) = 0$:
$Temps[k] := T[i, j]$:
$k := k + 1$:
end do:
$Eq[k] := -(1 + 2 \cdot \beta^2) \cdot T[i_{max} - 1, j] + T[i_{max} - 2, j] + \beta^2 \cdot (T[i_{max} - 1, j + 1] + T[i_{max} - 1, j - 1]) + \alpha \cdot \Delta x = 0$:
$Temps[k] := T[i_{max} - 1, j]$:

$k := k + 1 :$

end do:

> **for** k **from** 1 **to** N **do** $Eq[k]$ **end do**;

$$-4\ T_{2,\,2} + T_{3,\,2} + T_{2,\,3} = 0$$
$$-3\ T_{3,\,2} + T_{2,\,2} + T_{3,\,3} = 0$$
$$-4\ T_{2,\,3} + T_{3,\,3} + 100 + T_{2,\,2} = 0$$
$$-3\ T_{3,\,3} + T_{2,\,3} + 100 + T_{3,\,2} = 0$$

> $N := k - 1;$

$$N := 4$$

> $Eqs := \{seq(Eq[k],\ k = 1\,..N)\};$

$$Eqs := \{-4\ T_{2,\,2} + T_{3,\,2} + T_{2,\,3} = 0,\ -3\ T_{3,\,2} + T_{2,\,2} + T_{3,\,3} = 0,\ -4\ T_{2,\,3} + T_{3,\,3} + 100 + T_{2,\,2} = 0,\ -3\ T_{3,\,3} + T_{2,\,3} + 100 + T_{3,\,2} = 0\}$$

> $Tmps := [seq(Temps[k],\ k = 1\,..N)];$

$$Tmps := [T_{2,\,2},\ T_{3,\,2},\ T_{2,\,3},\ T_{3,\,3}]$$

> $SolT := evalf(solve(Eqs,\ Tmps));$

$$SolT := [[T_{2,\,2} = 16.84210526,\ T_{3,\,2} = 24.21052632,\ T_{2,\,3} = 43.15789474,\ T_{3,\,3} = 55.78947368]]$$

> $Eqs := [seq(Eq[k],\ k = 1\,..N)];$

$$Eqs := [-4\ T_{2,\,2} + T_{3,\,2} + T_{2,\,3} = 0,\ -3\ T_{3,\,2} + T_{2,\,2} + T_{3,\,3} = 0,\ -4\ T_{2,\,3} + T_{3,\,3} + 100 + T_{2,\,2} = 0,\ -3\ T_{3,\,3} + T_{2,\,3} + 100 + T_{3,\,2} = 0]$$

> $M,\ R := GenerateMatrix(Eqs,\ Tmps)$

$$M,\ R := \begin{bmatrix} -4 & 1 & 1 & 0 \\ 1 & -3 & 0 & 1 \\ 1 & 0 & -4 & 1 \\ 0 & 1 & 1 & -3 \end{bmatrix},\ \begin{bmatrix} 0 \\ 0 \\ -100 \\ -100 \end{bmatrix}$$

>

Condition Limite droite de Neumann discrétisée par un schéma décentré d'ordre 2:

```
> restart: with(LinearAlgebra) :
> L := 15; H := 15; ndx := 3; ndy := 3;
```

$$L := 15$$
$$H := 15$$
$$ndx := 3$$
$$ndy := 3$$

```
> Tg := 0; Tb := 0; Th := 100; α := 0
```

$$Tg := 0$$
$$Tb := 0$$
$$Th := 100$$
$$\alpha := 0$$

> $\Delta x := \frac{L}{ndx}; \Delta y := \frac{H}{ndy}; \beta := \frac{\Delta x}{\Delta y}$

$$\Delta x := 5$$
$$\Delta y := 5$$
$$\beta := 1$$

> $i_{max} := ndx + 1;\ j_{max} := ndy + 1;$

$$i_{max} := 4$$
$$j_{max} := 4$$

> $N := (i_{max} - 2) \cdot (j_{max} - 2);$

$$N := 4$$

> **for** j **from** 2 **to** $j_{max} - 1$ **do** $T[1, j] := Tg$ **end do**;

$$T_{1, 2} := 0$$
$$T_{1, 3} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, 1] := Tb$ **end do**;

$$T_{2, 1} := 0$$
$$T_{3, 1} := 0$$
$$T_{4, 1} := 0$$

> **for** i **from** 2 **to** i_{max} **do** $T[i, j_{max}] := Th$ **end do**;

$$T_{2, 4} := 100$$
$$T_{3, 4} := 100$$
$$T_{4, 4} := 100$$

> $k := 1:$

```
for j from 2 to j_max − 1 do
T[i_max, j] := 1/3·(4· T[i_max − 1, j] − T[i_max − 2, j] + 2·α·Δx);

  for i from 2 to i_max - 1 do
     Eq[k] := − 2·(1 + β^2)·T[i, j] + T[i + 1, j] + T[i − 1, j] + β^2·(T[i, j + 1]
   + T[i, j-1]) = 0 :
     Temps[k] := T[i, j] :
     k := k + 1 :
  end do:
end do:
```

```
> for k from 1 to N do Eq[k] end do;
```

$$-4\ T_{2,\,2}+T_{3,\,2}+T_{2,\,3}=0$$

$$-\frac{8}{3}\ T_{3,\,2}+\frac{2}{3}\ T_{2,\,2}+T_{3,\,3}=0$$

$$-4\ T_{2,\,3}+T_{3,\,3}+100+T_{2,\,2}=0$$

$$-\frac{8}{3}\ T_{3,\,3}+\frac{2}{3}\ T_{2,\,3}+100+T_{3,\,2}=0$$

```
>
> N := k − 1;
```

$$N:=4$$

```
> Eqs := {seq(Eq[k], k = 1 ..N) };
```

$$Eqs:=\left\{-4\ T_{2,\,2}+T_{3,\,2}+T_{2,\,3}=0,\ -\frac{8}{3}\ T_{3,\,2}+\frac{2}{3}\ T_{2,\,2}+T_{3,\,3}=0,\ -4\ T_{2,\,3}+T_{3,\,3}+100+T_{2,\,2}=0,\ -\frac{8}{3}\ T_{3,\,3}+\frac{2}{3}\ T_{2,\,3}+100+T_{3,\,2}=0\right\}$$

```
> Tmps := [seq(Temps[k], k = 1 ..N) ];
```

$$Tmps:=[T_{2,\,2},\ T_{3,\,2},\ T_{2,\,3},\ T_{3,\,3}]$$

```
> SolT := evalf(solve(Eqs, Tmps));
```

$$SolT:=[[T_{2,\,2}=17.56168360,\ T_{3,\,2}=26.26995646,\ T_{2,\,3}=43.97677794,\ T_{3,\,3}=58.34542816]]$$

```
>
> Eqs := [seq(Eq[k], k = 1 ..N) ];
```

$$Eqs:=\left[-4\ T_{2,\,2}+T_{3,\,2}+T_{2,\,3}=0,\ -\frac{8}{3}\ T_{3,\,2}+\frac{2}{3}\ T_{2,\,2}+T_{3,\,3}=0,\ -4\ T_{2,\,3}+T_{3,\,3}+100+T_{2,\,2}=0,\ -\frac{8}{3}\ T_{3,\,3}+\frac{2}{3}\ T_{2,\,3}+100+T_{3,\,2}=0\right]$$

```
> M, R := GenerateMatrix(Eqs, Tmps)
```

$$M, R := \begin{bmatrix} -4 & 1 & 1 & 0 \\ \frac{2}{3} & -\frac{8}{3} & 0 & 1 \\ 1 & 0 & -4 & 1 \\ 0 & 1 & \frac{2}{3} & -\frac{8}{3} \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ -100 \\ -100 \end{bmatrix}$$

\>

Condition Limite droite de Neumann discrétisée par un schéma décentré d'ordre 2 (Version 2):

\> $restart : with(LinearAlgebra) :$

\> $L := 15; H := 15; ndx := 3; ndy := 3;$

$$L := 15$$
$$H := 15$$
$$ndx := 3$$
$$ndy := 3$$

\> $Tg := 0; Tb := 0; Th := 100; \alpha := 0$

$$Tg := 0$$
$$Tb := 0$$
$$Th := 100$$
$$\alpha := 0$$

\> $\Delta x := \frac{L}{ndx}; \Delta y := \frac{H}{ndy}; \beta := \frac{\Delta x}{\Delta y}$

$$\Delta x := 5$$
$$\Delta y := 5$$
$$\beta := 1$$

\> $i_{max} := ndx + 1; \; j_{max} := ndy + 1;$

$$i_{max} := 4$$
$$j_{max} := 4$$

\> $N := (i_{max} - 2) \cdot (j_{max} - 2);$

$$N := 4$$

\> **for** j **from** 2 **to** $j_{max} - 1$ **do** $T[1, j] := Tg$ **end do**;

$$T_{1,2} := 0$$

$$T_{1,3} := 0$$

```
> for i from 2 to i_max do T[i, 1] := Tb end do;
```

$$T_{2,1} := 0$$

$$T_{3,1} := 0$$

$$T_{4,1} := 0$$

```
> for i from 2 to i_max do T[i, j_max] := Th end do;
```

$$T_{2,4} := 100$$

$$T_{3,4} := 100$$

$$T_{4,4} := 100$$

```
> k := 1 :
  for j from 2 to j_max − 1 do
    for i from 2 to i_max - 2 do
        Eq[k] := − 2·(1 + β^2)·T[i, j] + T[i + 1, j] + T[i − 1, j] + β^2·(T[i, j + 1]
      + T[i, j-1]) = 0 :
        Temps[k] := T[i, j] :
        k := k + 1 :
     end do:
   Eq[k] := − 2·(1 + 3·β^2)·T[i_max − 1, j] + 2· T[i_max − 2, j] + 3· β^2·(T[i_max
      − 1, j + 1] + T[i_max − 1, j − 1]) + 2·α·Δx = 0 :
   Temps[k] := T[i_max − 1, j] :
   k := k + 1 :

  end do:
```

```
> for k from 1 to N do Eq[k] end do;
```

$$-4\ T_{2,2} + T_{3,2} + T_{2,3} = 0$$

$$-8\ T_{3,2} + 2\ T_{2,2} + 3\ T_{3,3} = 0$$

$$-4\ T_{2,3} + T_{3,3} + 100 + T_{2,2} = 0$$

$$-8\ T_{3,3} + 2\ T_{2,3} + 300 + 3\ T_{3,2} = 0$$

```
> N := k − 1;
```

$$N := 4$$

```
> Eqs := {seq(Eq[k], k = 1 ..N)};
```

$$Eqs := \{-4\ T_{2,2} + T_{3,2} + T_{2,3} = 0,\ -8\ T_{3,2} + 2\ T_{2,2} + 3\ T_{3,3} = 0,\ -4\ T_{2,3} + T_{3,3} + 100 + T_{2,2} = 0,\ -8\ T_{3,3} + 2\ T_{2,3} + 300 + 3\ T_{3,2} = 0\}$$

```
> Tmps := [seq(Temps[k], k = 1 ..N) ];
```

$$Tmps := [T_{2,2}, T_{3,2}, T_{2,3}, T_{3,3}]$$

```
> SolT := evalf(solve(Eqs, Tmps));
```

$$SolT := [[T_{2,2} = 17.56168360, T_{3,2} = 26.26995646, T_{2,3} = 43.97677794, T_{3,3} = 58.34542816]]$$

```
> Eqs := [seq(Eq[k], k = 1 ..N) ];
```

$$Eqs := [-4\ T_{2,2} + T_{3,2} + T_{2,3} = 0, -8\ T_{3,2} + 2\ T_{2,2} + 3\ T_{3,3} = 0, -4\ T_{2,3} + T_{3,3} + 100 + T_{2,2} = 0, -8\ T_{3,3} + 2\ T_{2,3} + 300 + 3\ T_{3,2} = 0]$$

```
> M, R := GenerateMatrix(Eqs, Tmps)
```

$$M, R := \begin{bmatrix} -4 & 1 & 1 & 0 \\ 2 & -8 & 0 & 3 \\ 1 & 0 & -4 & 1 \\ 0 & 3 & 2 & -8 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ -100 \\ -300 \end{bmatrix}$$

```
>
```