$$\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} - IK\left(u\frac{\partial T}{\partial x} + v\frac{\partial T}{\partial y}\right) = 0$$
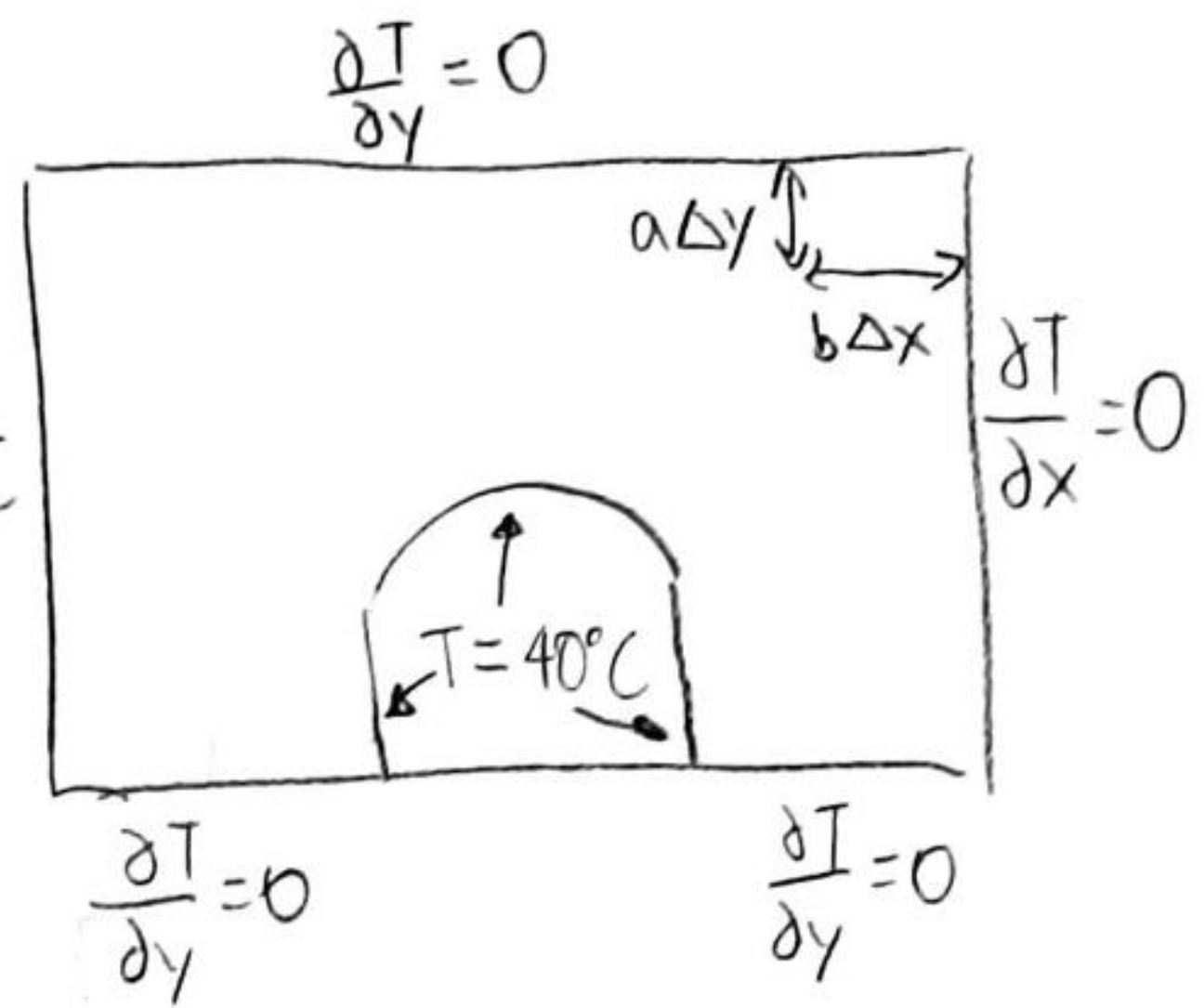
$$IK = \frac{\rho\, C_{par}}{K_{ar}}$$

$\varepsilon = 0,01$

$\Delta x = \Delta y = 0,375 \;;\; \lambda = 1,85$

$u > 0 \Rightarrow \dfrac{\partial T}{\partial x} = \dfrac{T_{i,j} - T_{i-1,j}}{\Delta x}$ $\Big|$ $v > 0 \Rightarrow \dfrac{\partial T}{\partial y} = \dfrac{T_{i,j} - T_{i,j-1}}{\Delta y}$

$\Big|$ $v < 0 \Rightarrow \dfrac{\partial T}{\partial y} = \dfrac{T_{i,j+1} - T_{i,j}}{\Delta y}$

Top right diagram:

$\dfrac{\partial T}{\partial y} = 0$

$a\Delta y$, $b\Delta x$

$\dfrac{\partial T}{\partial x} = 0$

$T = 20°C$

$T = 40°C$

$\dfrac{\partial T}{\partial y} = 0$, $\dfrac{\partial T}{\partial y} = 0$

.$\boxed{\text{Ponto interno}}$

$\underline{\dfrac{v > 0}{T_{i,j}}} = \dfrac{IK.\Delta x (u T_{i-1,j} + v T_{i,j-1}) + T_{i+1,j} + T_{i-1,j} + T_{i,j+1} + T_{i,j-1}}{IK\,\Delta x\,(u+v) + 4}$

$\underline{\dfrac{v < 0}{T_{i,j}}} = \dfrac{IK.\Delta x (u T_{i-1,j} - v T_{i,j+1}) + T_{i+1,j} + T_{i-1,j} + T_{i,j+1} + T_{i,j-1}}{IK\,\Delta x\,(u-v) + 4}$

$\boxed{\text{Limite esquerdo}}$

$T = T_{fora} \Leftrightarrow T_{i,j} = 20°C$

$\boxed{\text{Limite superior}}$

$$T_{i,j} = \frac{T_{i+1,j} + T_{i-1,j} + 2T_{i,j-1} + IK\,u\,\Delta x\, T_{i-1,j}}{IK.\Delta x.u + 4}$$

$\boxed{\text{Limite direito}}$

$\underline{\dfrac{v > 0}{T_{i,j}}} = \dfrac{2 T_{i-1,j} + T_{i,j+1} + T_{i,j-1} + IK\,\Delta x\, v\, T_{i,j-1}}{IK\,\Delta x\, v + 4}$

$\underline{\dfrac{v < 0}{T_{i,j}}} = \dfrac{2 T_{i-1,j} + T_{i,j+1} + T_{i,j-1} - IK\,\Delta x\, v\, T_{i,j+1}}{-IK\,\Delta x\, v + 4}$

$$T_{i,j} = \frac{T_{i+1,j} + T_{i-1,j} + 2\,\overline{T_{i,j+1}} + IK_u\,\Delta x\,T_{i-1,j}}{IK\Delta x_u + 4}$$

Canto esquerdo superior

$$T_{i,j} = T_{fora} = 20°C$$

Canto esquerdo inferior

$$T_{i,j} = T_{fora} = 20°C$$

Canto direito superior

$$T_{i,j} = \frac{T_{i-1,j} + \overline{T_{i,j-1}}}{2}$$

Canto direito inferior

$$T_{i,j} = \frac{T_{i-1,j} + \overline{T_{i,j+1}}}{2}$$

Galpão

$$a = \frac{21 - i\,\Delta y - \sqrt{3^2 - (j\Delta x - 18)^2}}{\Delta y}$$

$$b = \frac{|18 - j\Delta x| - 3\cos\left(\arcsen\left(\frac{21 - i\Delta y}{3}\right)\right)}{\Delta x}$$

Borda esquerda

$V \geq 0$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{2\,T_{i-1,j}}{b+1} + T_{i,j+1} + T_{i,j-1} + IK\,\Delta x\,(u\,T_{i-1,j} + v\,T_{i,j-1})}{\dfrac{2}{b} + 2 + IK\Delta x\,(u+v)}$$

$V < 0$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{2\,T_{i-1,j}}{b+1} + T_{i,j+1} + T_{i,j-1} + IK\,\Delta x\,(u\,T_{i-1,j} - v\,T_{i,j+1})}{\dfrac{2}{b} + 2 + IK\Delta x\,(u-v)}$$

$\underline{v > 0}$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{2\,T_{i+1,j}}{b+1} + T_{i,j+1} + T_{i,j-1} + lK\,\Delta x\,(u\,\overline{T}_{i-1,j} + v\,\overline{T}_{i,j-1})}{\dfrac{2}{b} + 2 + lK\,\Delta x\,(u+v)}$$

$\underline{v < 0}$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{2\,\overline{T}_{i+1,j}}{b+1} + \overline{T}_{i,j+1} + \overline{T}_{i,j-1} + lK\,\Delta x\,(u\,\overline{T}_{i-1,j} - v\,\overline{T}_{i,j+1})}{\dfrac{2}{b} + 2 + lK\,\Delta x\,(u-v)}$$

Telhado esquerdo

$\underline{v > 0}$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{80}{a(a+1)} + \dfrac{2\,T_{i-1,j}}{b+1} + \dfrac{2\,\overline{T}_{i,j+1}}{a+1} + lK\,\Delta x\,(u\,\overline{T}_{i-1,j} + v\,\overline{T}_{i,j-1})}{\dfrac{2}{b} + \dfrac{2}{a} + lK\,\Delta x\,(u+v)}$$

$\underline{v < 0}$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{80}{a(a+1)} + \dfrac{2\,T_{i-1,j}}{b+1} + \dfrac{2\,\overline{T}_{i,j+1}}{a+1} + lK\,\Delta x\,(u\,\overline{T}_{i-1,j} - v\,\overline{T}_{i,j+1})}{\dfrac{2}{b} + \dfrac{2}{a} + lK\,\Delta x\,(u-v)}$$

Telhado direito

$\underline{v > 0}$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{80}{a(a+1)} + \dfrac{2\,T_{i+1,j}}{b+1} + \dfrac{2\,\overline{T}_{i,j+1}}{a+1} + lK\,\Delta x\,(u\,\overline{T}_{i-1,j} + v\,\overline{T}_{i,j-1})}{\dfrac{2}{b} + \dfrac{2}{a} + lK\,\Delta x\,(u+v)}$$

$\underline{v < 0}$

$$T_{i,j} = \frac{\dfrac{80}{b(b+1)} + \dfrac{80}{a(a+1)} + \dfrac{2\,T_{i+1,j}}{b+1} + \dfrac{2\,\overline{T}_{i,j+1}}{a+1} + lK\,\Delta x\,(u\,\overline{T}_{i-1,j} - v\,\overline{T}_{i,j+1})}{\dfrac{2}{b} + \dfrac{2}{a} + lK\,\Delta x\,(u-v)}$$

Telhado superior

$V > 0$

$$T_{i,j} = \dfrac{\dfrac{80}{a(a+1)} + 2\dfrac{T_{i,j+1}}{a+1} + T_{i-1,j} + T_{i+1,j} + lK\,\Delta x\left(u\,T_{i-1,j} + v\,T_{i,j-1}\right)}{2 + \dfrac{2}{a} + lK\,\Delta x(u+v)}$$

$V < 0$

$$T_{i,j} = \dfrac{\dfrac{80}{a(a+1)} + 2\dfrac{T_{i,j+1}}{a+1} + T_{i-1,j} + T_{i+1,j} + lK\,\Delta x\left(u\,T_{i-1,j} - v\,T_{i,j+1}\right)}{2 + \dfrac{2}{a} + lK\,\Delta x(u-v)}$$