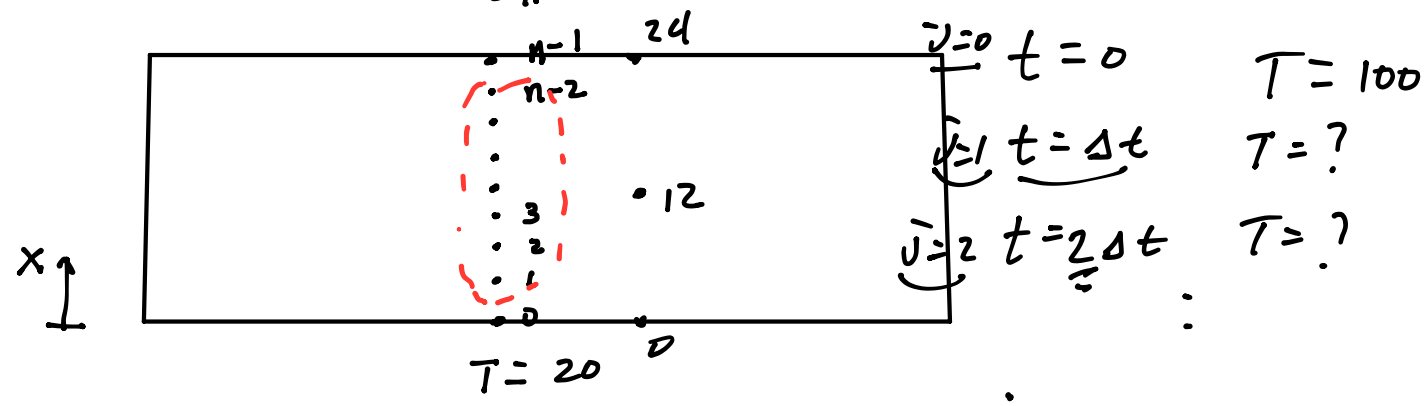
M. EXPLICITO

$T(x,0) = 100^\circ C$



$$\alpha \frac{\partial^2 T}{\partial x^2} = \frac{\partial T}{\partial t} \qquad T(x,t) \qquad T_i^j \rightarrow T(x_i, t_j)$$

$i = 1, \dots n-2$

$$\alpha \left(\frac{T_{i+1}^j - 2T_i^j + T_{i-1}^j}{\Delta x^2} \right) = \frac{T_i^{j+1} - T_i^j}{\Delta t}$$

(??)

$$T_i^{j+1} = T_i^j + \alpha \Delta t \left(\frac{T_{i+1}^j - 2T_i^j + T_{i-1}^j}{\Delta x^2} \right)$$

$i = 0 \qquad T_i^{j+1} = 20$

$t = 100$ secs

$\Delta t = 0.1$ $\quad nt = \frac{100}{0.1}$

$i = n-1$

$$\frac{T_i^{j+1} - T_{i-1}^{j+1}}{\Delta x} = 0 \qquad T_i^{j+1} = T_{i-1}^{j+1}$$

$T_i^j \rightarrow T(x_i, t_j)$

$T_i^{j+1} \rightarrow T(x_i, t_j + \Delta t)$

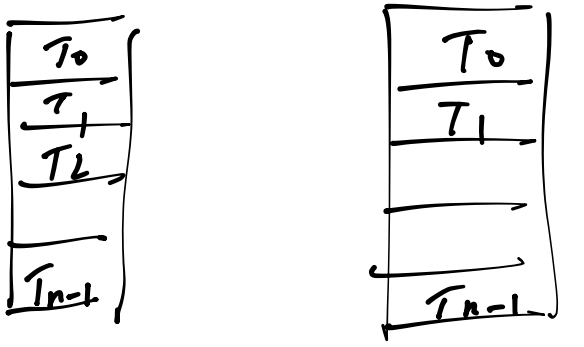
$t = 0.$

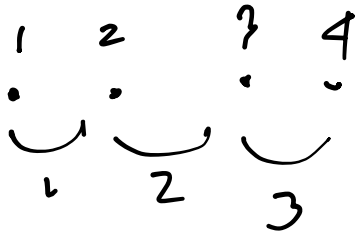
$t_f = 100$

$dt = 0.3$

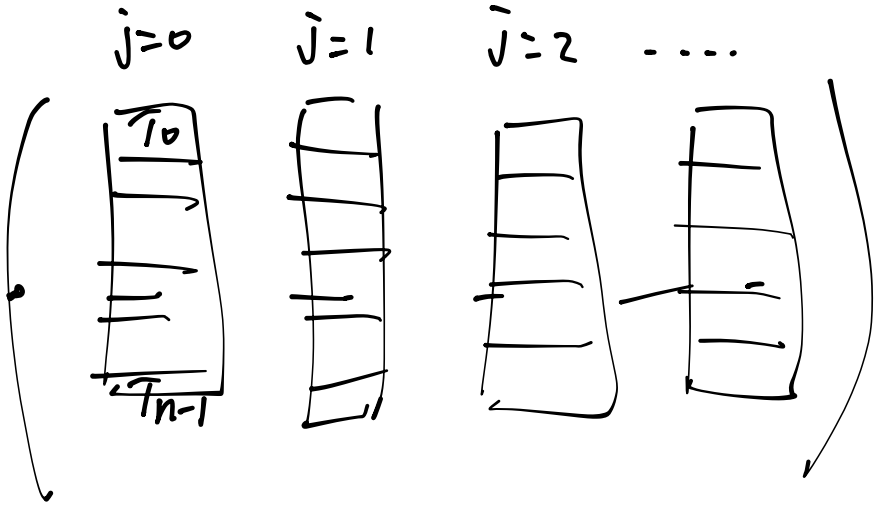
$n = \frac{t_f}{dt}$

T^j $\quad$ T^{j+1}



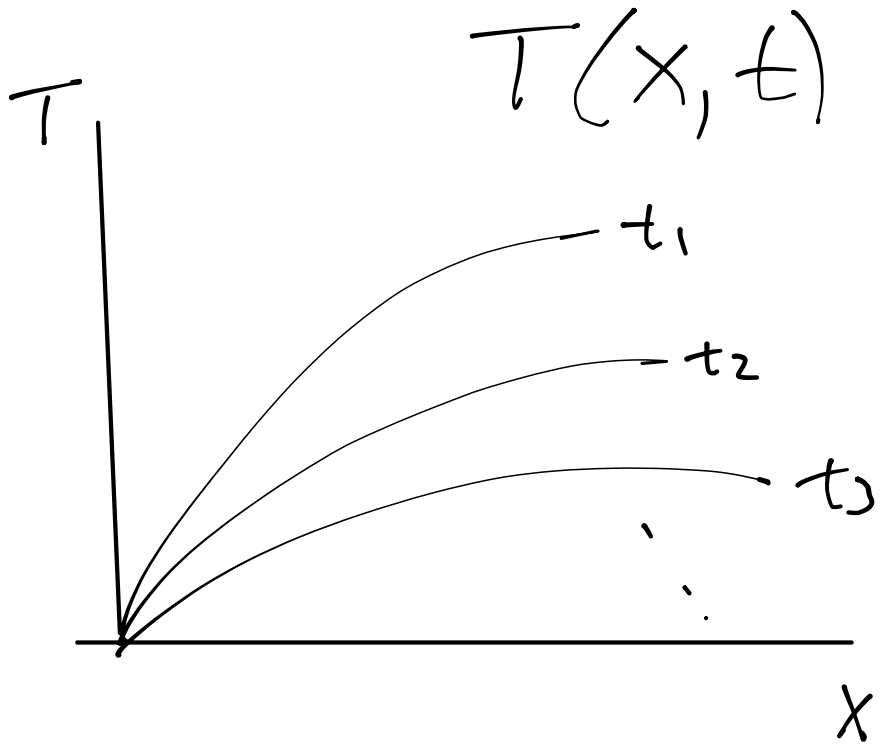


$H =$



$\frac{dy}{dt} = f(x,t)$ $\quad$ $\frac{y^{j+1} - y^j}{\Delta t} = f(y^j, t^j)$

$y^{j+1} = y^j + \Delta t f(y, t^j)$

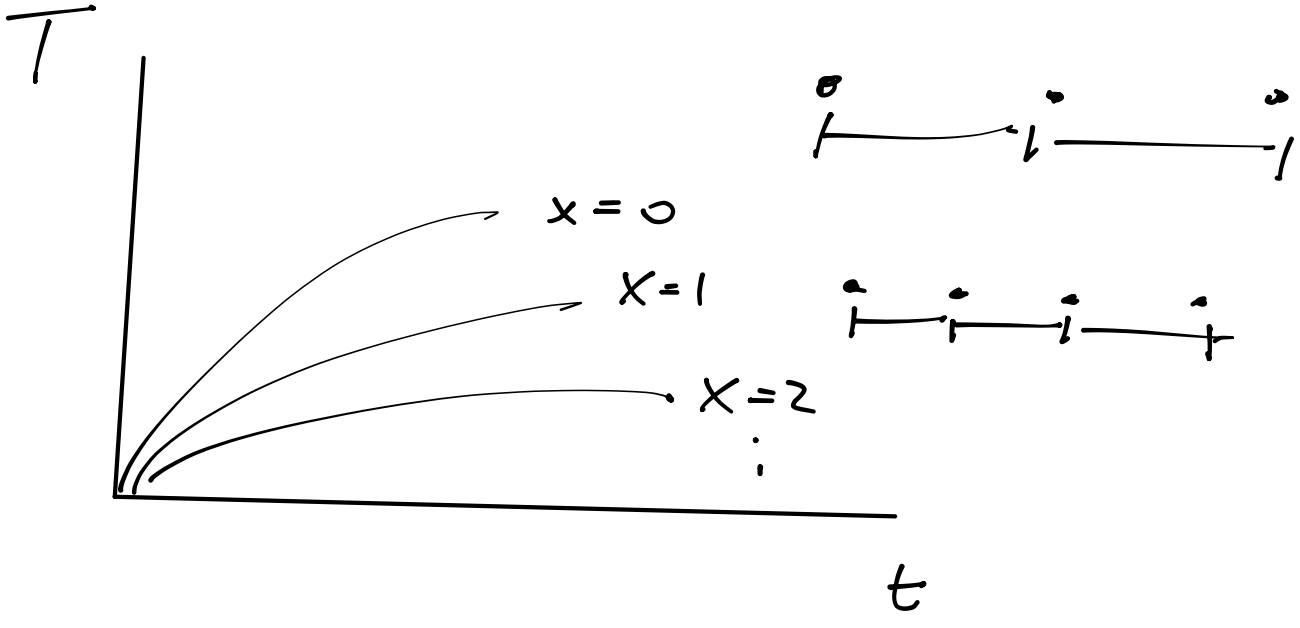


range(0, 7) →

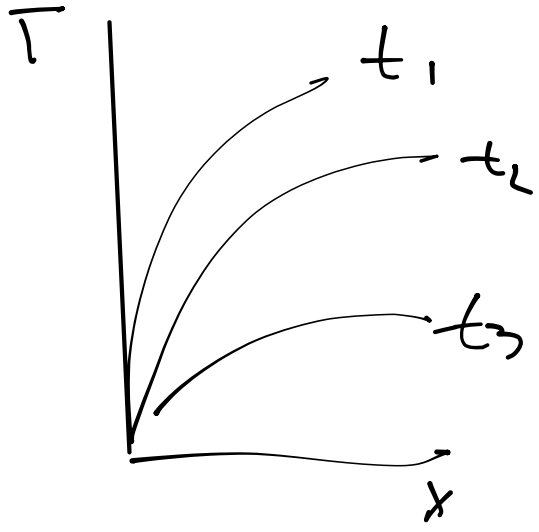
0 1 2 3 4 5 6

range(0, 7, 2)

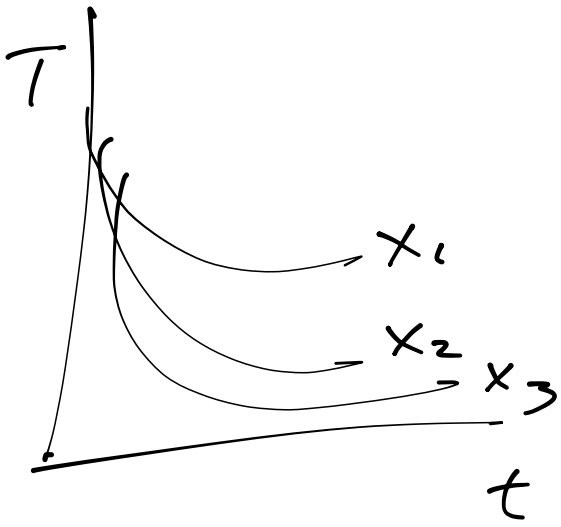
0 3 5



$T(x, t)$



$T(x, t)$



M. IMPLICITO

$$\alpha \frac{\partial^2 T}{\partial x^2} = \frac{\partial T}{\partial t} \qquad T(x,t) \quad T_i^j \rightarrow T(x_i, t$$

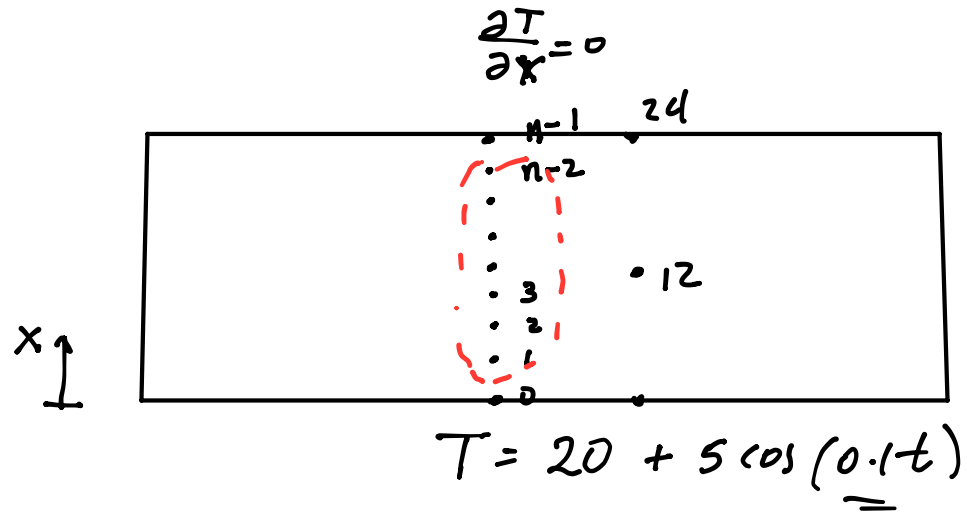
$i = 1, \dots n-2$

$$\alpha \left(\frac{T_{i+1}^{j+1} - 2T_i^{j+1} + T_{i-1}^{j+1}}{\Delta x^2} \right) = \frac{T_i^{j+1} - T_i^j}{\Delta t} \qquad ?!$$

$i = 0 \qquad T_1^{j+1} = 20$

Δ

$i = n-1 \qquad \dfrac{T_i^{j+1} - T_{i-1}^{j+1}}{\Delta x} = 0 \qquad T_i^{j+1} = T_{i-1}^{j+1} \qquad \dfrac{\partial T}{\partial x} = 0$



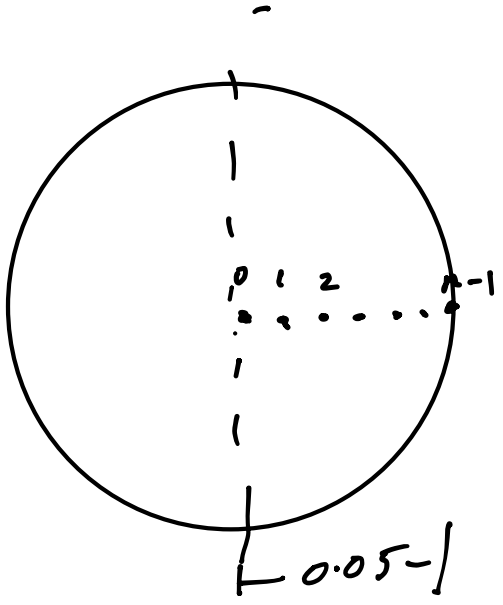
$$\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial T}{\partial r}\right) + 100 = \frac{\partial T}{\partial t}$$

$r = 0 \quad \frac{\partial T}{\partial r} = 0$

$r = 0.05 \quad T = 30$

$T(r, 0) = 30$

$$\frac{\partial^2 T}{\partial r^2} + \frac{1}{r}\frac{\partial T}{\partial r} + 100 = \frac{\partial T}{\partial t}$$



$i = 0 \quad \frac{T_{i+1}^{j+1} - T_i^{j+1}}{\Delta r} = 0$

$i = 1, \ldots, n-1$

$$\frac{T_{i+1}^{j+1} - 2T_i^{j+1} + T_{i-1}^{j+1}}{\Delta r^2} + \frac{1}{r_i}\left(\frac{T_{i+1}^{j+1} - T_{i-1}^{j+1}}{2\Delta r}\right) + 100 = \frac{T_i^{j+1} - T_i^{j}}{\Delta t}$$

$i = n-1$

$$T_i^{j+1} = 30$$