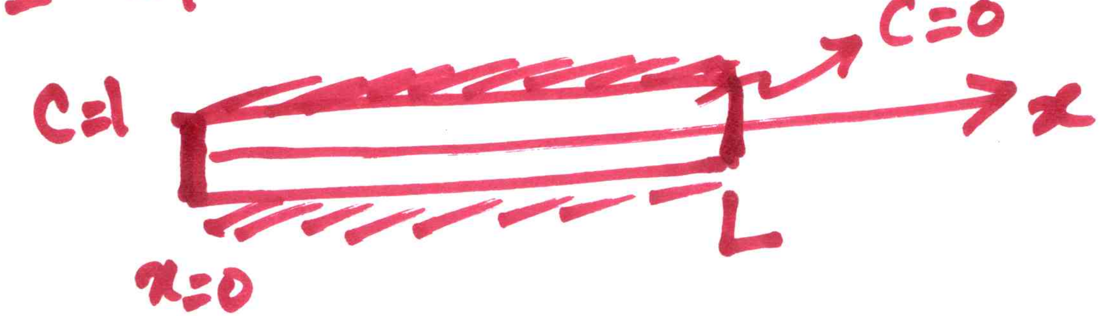
$$\frac{\partial C}{\partial t} = D \frac{\partial^2 C}{\partial x^2}$$

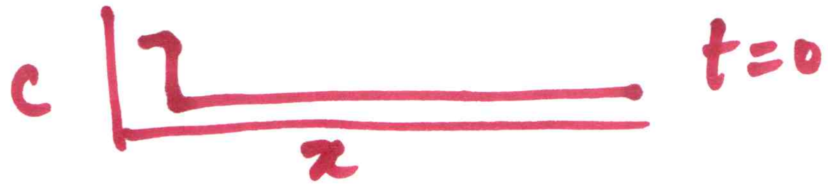
$$C_i^{t+\Delta t} = C_i^t + \frac{D \Delta t}{(\Delta x)^2}\left(C_{i-1}^t - 2C_i^t + C_{i+1}^t\right)$$

$$\frac{D \Delta t}{(\Delta x)^2} = \alpha$$

$$C_i^{t+\Delta t} = C_i^t (1 - 2\alpha) + \alpha \left(C_{i-1}^t + C_{i+1}^t\right)$$

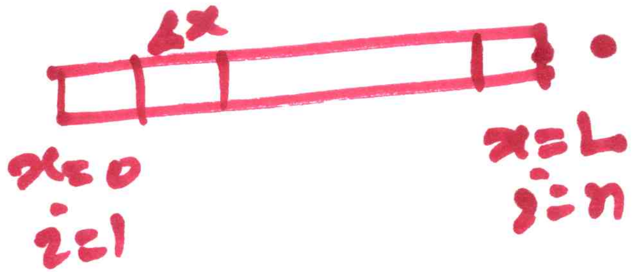


$$\left(\frac{\partial C}{\partial x}\right)_L = 0$$



$C_{i=1}(t) = 1$ ✓

$$\underset{i=1}{C_i^{t+\Delta t}} = C_i^t(1-2\alpha) + \alpha\left(C_{i-1}^t + C_{i+1}^t\right)$$



$i = n, \quad x = L.$

$$\left(\frac{\partial C}{\partial x}\right)_L = 0$$

$$\left(\frac{C_{i+1} - C_{i-1}}{2\Delta x}\right)_{x=L,\ i=n} = 0 \qquad C_{i-1} = C_{i+1}$$

$$\rightarrow C_i^{t+\Delta t} = C_i^t(1-2\alpha) + 2\alpha C_{i-1}^t$$

$$\frac{\partial C}{\partial t} = D\frac{\partial^2 C}{\partial x^2}$$

$$\frac{C_i^{t+\Delta t} - C_i^{t}}{\Delta t} = \frac{D}{(\Delta x)^2}\left[C_{i-1}^{t+\Delta t} + C_{i+1}^{t+\Delta t} - 2C_i^{t+\Delta t}\right]$$

$$\left(\frac{\partial C}{\partial x}\right)_L = 0$$

$$C_i^{t+\Delta t}(1+2\alpha) - \alpha C_{i-1}^{t+\Delta t} - C_{i+1}^{t+\Delta t} = C_i^{t} \cdot$$

$$\underset{\mathbb{A}}{\begin{bmatrix} & & & & \\ \cdots & -\alpha & 1+2\alpha & -\alpha & \cdots \\ & & & -2\alpha & 1+2\alpha \end{bmatrix}} \underset{\mathbb{C}^{t+\Delta t}}{\begin{bmatrix} \\ \\ \\ \end{bmatrix}} = \underset{\mathbb{C}^{t}}{\begin{bmatrix} \\ \\ \\ \end{bmatrix}}$$

100×100

101×101

$$A\,\mathbb{C}^{t+\Delta t} = \mathbb{C}^{t}$$

$$\mathbb{C}^{t+\Delta t} = inv(A) * \mathbb{C}^{t}$$

$$\boxed{\mathbb{C}^{t+\Delta t} = A^{-1}\mathbb{C}^{t}}$$

$$C^{old} = \mathbb{C}^{t}.$$

$$C = \mathbb{C}^{t+\Delta t}.$$