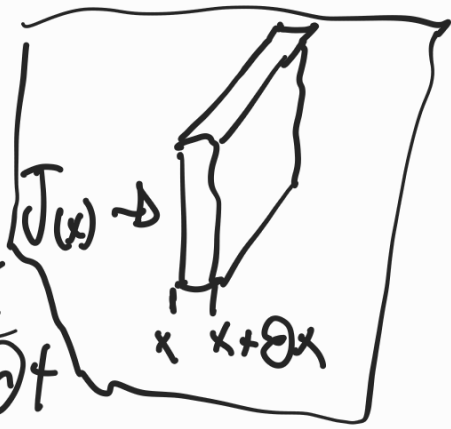


Como varia a concentração na placa?
 $C(x, t)$

- Pensar em um ∂t
- Pela esquerda entra $J(x) A \partial t$
- Pela direita sai $J(x + \partial x) A \partial t$
- Volume da placa é $A \partial x$



$$\partial C(x, t) = \frac{J(x) \partial t A - J(x + \partial x) \partial t A}{A \partial x}$$

Expandindo em Taylor e truncando em ordem 1.

$$J(x + \partial x) = J(x) + \frac{\partial J(x)}{\partial x} \partial x$$

$$\partial C(x, t) = \frac{J(x) \partial t A - \left[J(x) + \frac{\partial J(x)}{\partial x} \partial x \right] \partial t A}{A \partial x}$$

$$\partial C(x, t) = \frac{[J(x) - J(x) - \frac{\partial J(x)}{\partial x} \partial x] \partial t A}{A \partial x}$$

$$\partial C(x, t) = - \frac{\frac{\partial J(x)}{\partial x} \partial x \partial t}{\partial x} = - \frac{\partial J(x)}{\partial x} \partial t$$

$$\frac{\partial C(x,t)}{\partial t} = - \frac{\partial J(x)}{\partial x}$$

Da 1^a Lei de Fick

$$J(x) = -D \frac{\partial C(x,t)}{\partial x}$$

$$\frac{\partial C(x,t)}{\partial t} = - \frac{\partial}{\partial x} \left[-D \frac{\partial C(x,t)}{\partial x} \right]$$

$$\frac{\partial C(x,t)}{\partial t} = D \frac{\partial^2 C(x,t)}{\partial x^2} \Rightarrow 2^{\text{a}} \text{ Lei de Fick}$$