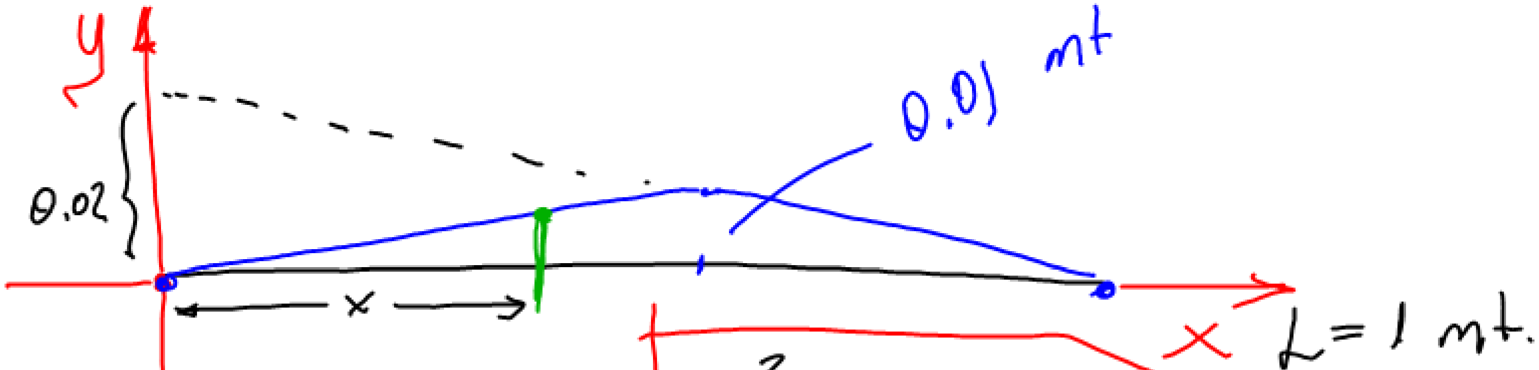

$y(x,t)$

$$\boxed{\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}} \qquad c^2 = \frac{\rho}{\nabla}$$

$$\underline{\underline{\text{CF}}} \begin{cases} y(0,t) = 0 \\ y(1,t) = 0 \end{cases}$$

espacio

$$\underline{\underline{\text{CI}}} \begin{cases} y(x,0) = \begin{cases} \frac{0.01}{0.5}x & ; 0 \leq x < \frac{1}{2} \\ 0.02 - \frac{0.01}{0.5}x ; & \frac{1}{2} \leq x \leq 1 \end{cases} \\ \left.\frac{\partial y}{\partial t}\right|_{t=0} = 0 \end{cases}$$

en el tiempo

$$y(0,t)=0 \qquad y(x,t)=F(x)\cdot G(t)$$

$$\rightarrow F(0)\cdot G(t)=0 \qquad G(t)\neq 0$$

$$F(0)=0 \qquad \underset{\alpha=0}{F(x)}=C_1x+C_2$$

$$C_1(0)+C_2=0 \qquad C_2=0 \qquad F(x)=C_1x$$

$$\rightarrow y(1,t)=0$$

$$F(1)\cdot G(t)=0$$

$$F(1)=0 \longrightarrow C_1\cdot(1)=0 \longrightarrow C_1=0$$

$$F(x) = \frac{C_1}{e^{\beta x}} + C_2 e^{\beta x}$$

$$F(0) = 0 \qquad \frac{C_1}{1} + C_2 \cdot (1) = 0 \qquad C_1 + C_2 = 0$$

$$C_1 = -C_2$$

$$F(x) = \frac{-C_2}{e^{\beta x}} + C_2 e^{\beta x}$$

$$F(1) = 0 \qquad -\frac{C_2}{e^{\beta}} + C_2 e^{\beta} = 0 \qquad C_2 e^{\beta} = \frac{C_2}{e^{\beta}}$$

$$(e^{\beta})^2 = \frac{C_2}{C_2}$$

$$\beta = 0$$

$$F(x) = C_1 \operatorname{sen}(\beta x) + C_2 \cos(\beta x)$$

$$F(0) = 0 \qquad C_1 \operatorname{sen}(0) + C_2 \cos(0) = 0$$

$$C_2 \cdot (1) = 0 \qquad C_2 = 0$$

$$F(x) = C_1 \operatorname{sen}(\beta x)$$

$$F(1) = 0 \qquad C_1 \operatorname{sen}(\beta) = 0 \qquad C_1 \neq 0$$

$$\beta = n\pi \qquad \forall n \in \mathbb{N} \qquad \alpha = -n^2\pi^2$$

$$F(x) = C_1 \operatorname{Sen}(n\pi x)$$

$$y(x,t) = \operatorname{sen}(n\pi x)\left(c_1 \cos(n\pi t) + c_2 \operatorname{sen}(n\pi t)\right).$$

para cada $n \in \mathbb{N}$ c_1, c_2

$$y(x,t) = \sum_{n=1}^{\infty} \operatorname{sen}(n\pi x)\left(b_n \cos(n\pi t) + a_n \operatorname{sen}(n\pi t)\right)$$