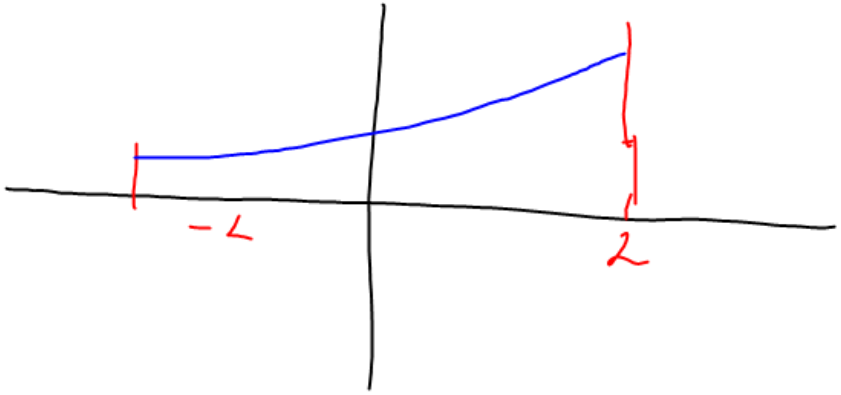
SÉRIE TRIGONOMÉTRICA FOURIER

$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} \left(a_n \cos\left(\frac{n\pi}{L}x\right) + b_n \cdot \operatorname{sen}\left(\frac{n\pi}{L}x\right) \right).$$

$$a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx$$

$$a_n = \frac{1}{L}\int_{-L}^{L} f(x)\cdot \cos\left(\frac{n\pi}{L}x\right)dx$$

$$b_n = \frac{1}{L}\int_{-L}^{L} f(x)\operatorname{sen}\left(\frac{n\pi}{L}x\right)dx$$

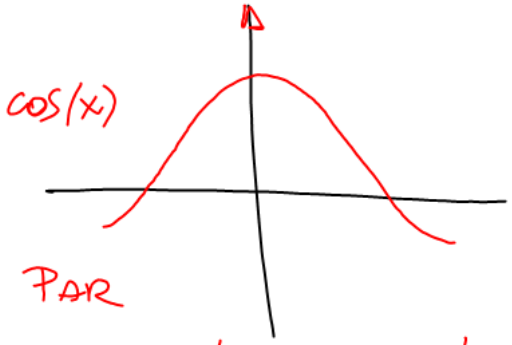


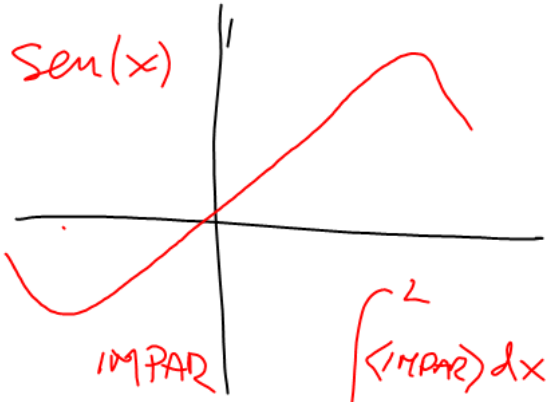
$f(x)$ es par

$$f(-x) = f(x) \quad -L \le x \le L$$

$f(x)$ es impar

$$f(-x) = -f(x) \quad -L \le x \le L$$





$$\int_{-L}^{L} \langle PAR \rangle \, dx = 2 \int_{0}^{L} \langle par \rangle \, dx$$

$$\int_{-L}^{L} \langle IMPAR \rangle \, dx = 0$$

$$\langle par \rangle \langle par \rangle = \langle par \rangle \qquad \langle IMPAR \rangle \langle IMPAR \rangle = \langle par \rangle$$

$$\langle IMPAR \rangle \langle PAR \rangle = \langle IMPAR \rangle$$

$f \Rightarrow par$

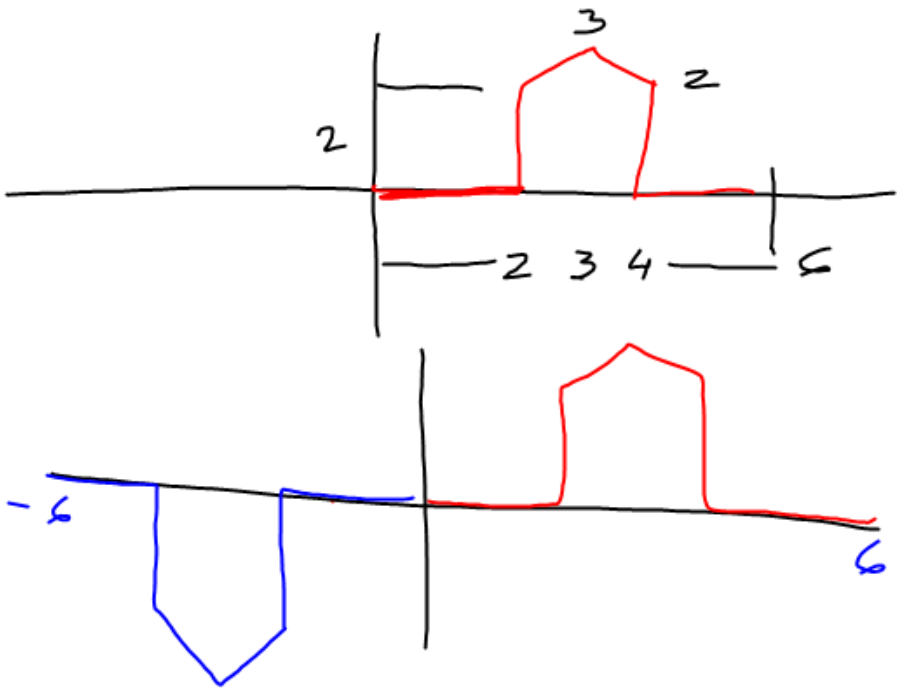
$$a_0 = \frac{1}{L}\int_{-L}^{L} f\,dx \Rightarrow \frac{2}{L}\int_{0}^{L} f\,dx \neq 0$$

$$a_n = \frac{1}{L}\int_{-L}^{L} f \cdot \cos\left(\frac{n\pi}{L}x\right)dx = \frac{2}{L}\int_{0}^{L} f \cdot \cos\left(\frac{n\pi}{L}x\right)dx \neq 0$$

$$b_n = \frac{1}{L}\int_{-L}^{L} f \cdot \operatorname{sen}\left(\frac{n\pi}{L}x\right)dx = 0$$

$$STF_{PAR} = \frac{a_0}{2} + \sum_{n=1}^{\infty}\left(a_n \cdot \cos\left(\frac{n\pi}{L}x\right)\right)$$

$$STF_{IMPAR} = \sum_{n=1}^{\infty}\left(b_n \cdot \operatorname{sen}\left(\frac{n\pi}{L}\cdot x\right)\right)$$


3
2
2
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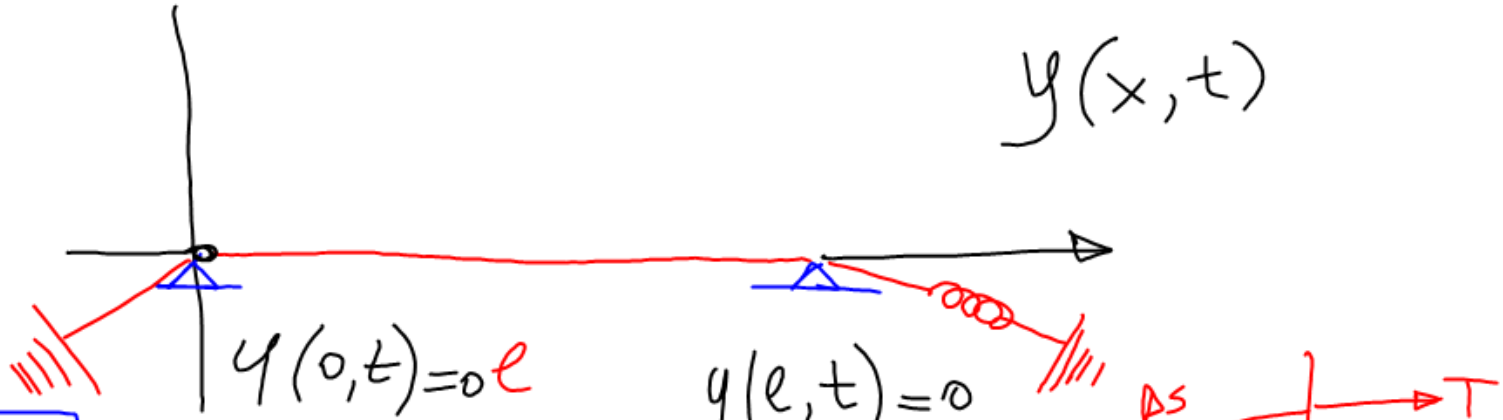
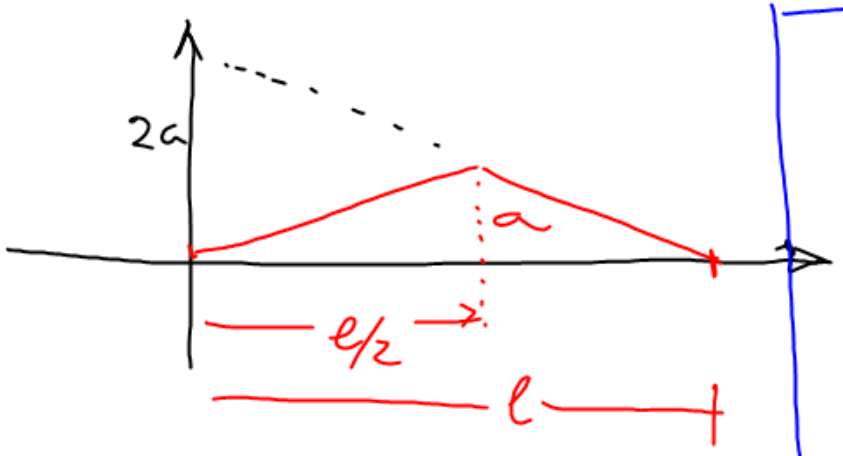


condiciones frontera

$y(0,t)=0$

$y(\ell,t)=0$

$$\frac{\partial^2 y}{\partial t^2} - c^2 \frac{\partial^2 y}{\partial x^2} = 0$$



condiciones iniciales

$$y(x,0) \begin{cases} \frac{a}{\ell/2}x \; ; & 0 \le x \le \ell/2 \\ 2a - \frac{a}{\ell/2}x \; ; & \ell/2 \le x \le \ell \end{cases}$$

$y'(x,0)=0$