Serie Trigonométrica de Fourier

$$f(t) = C + \sum_{n=1}^{\infty}\left(a_n \cos\left(\frac{n\pi}{L}t\right) + b_n \operatorname{sen}\left(\frac{n\pi}{L}t\right)\right)$$

$a < t < b$

$L = \frac{b-a}{2}$

Simetría { PAR, IMPAR

$a < t < b$

$f(t)$ ES PAR $\quad f(-t) = f(t)$

$y(t) = t^2 \quad f(-4) = f(4)$

$(-4)^2 = (4)^2$

$16 = 16$

$a < t < b$

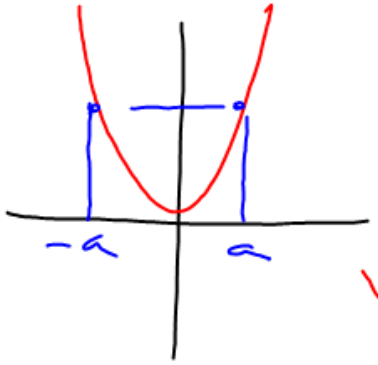
$f(t)$ ES IMPAR $\quad f(-t) = -f(t)$

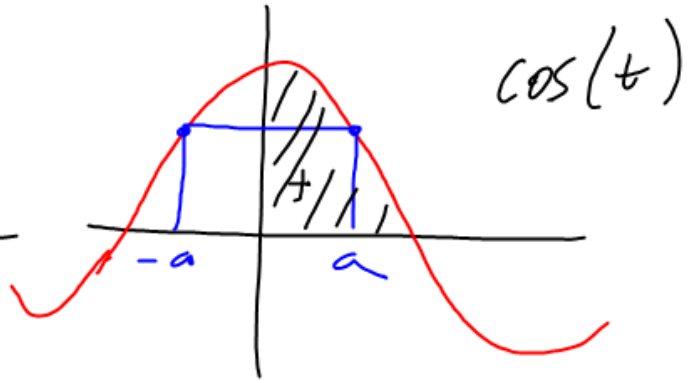
$y(t) = t^3 \quad f(-3) = -f(3)$

$(-3)^3 = -(3)^3$

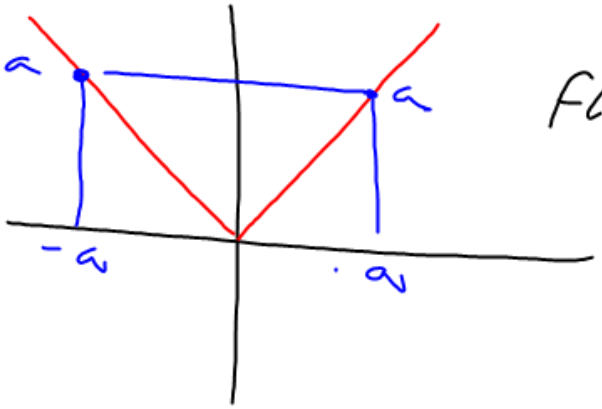
$-27 = -(27)$

$f(t)$ PAR $\quad f(-a) = f(a)$

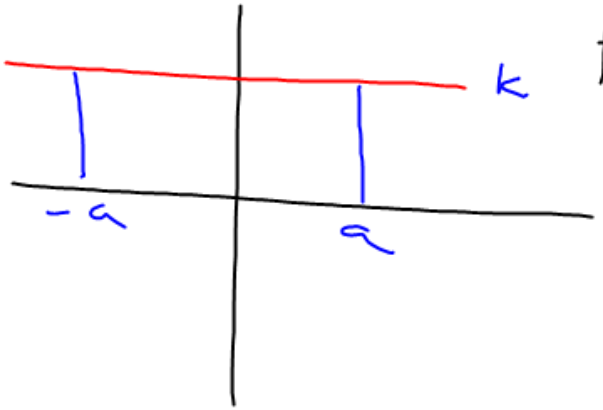




$\cos(t)$

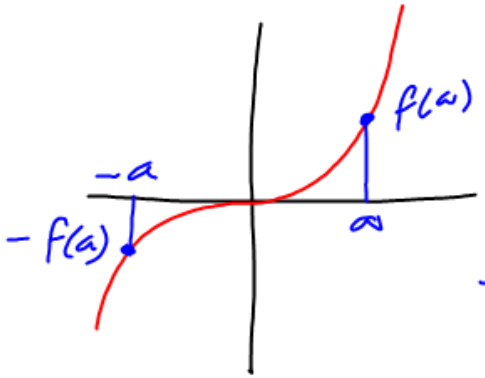


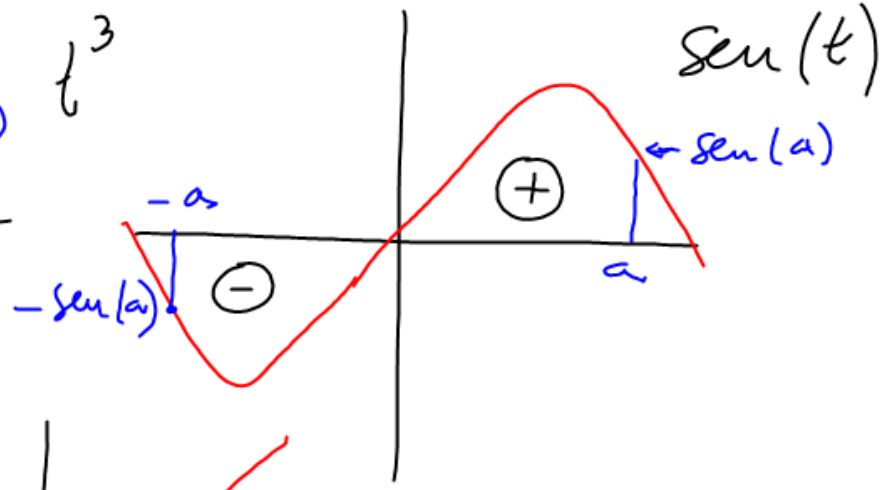
$f(t) = |t|$

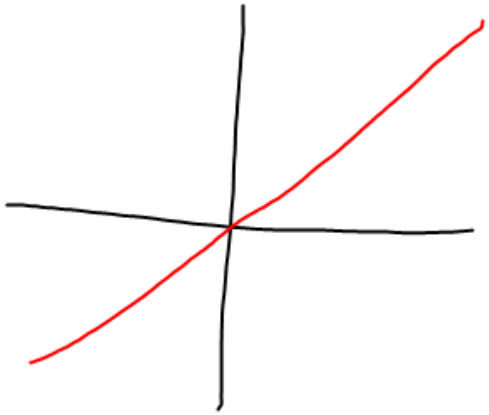


$f(t) = k$

$f(t)$ IMPAR $\quad f(-t) = -f(t)$

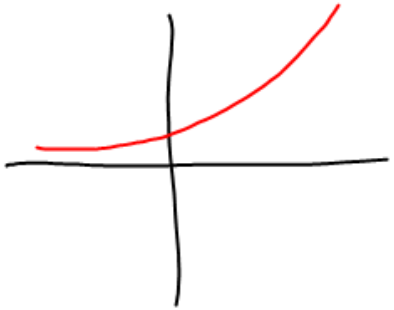


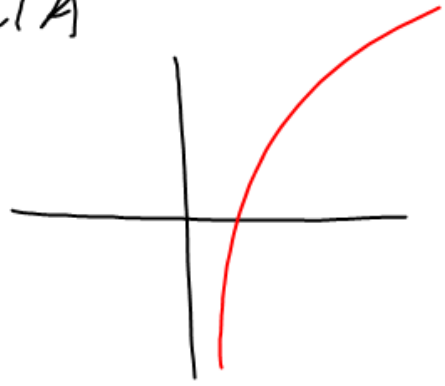




$f(t) = t$

SIN SIMETRÍA





$$\langle PAR \rangle \cdot \langle PAR \rangle = \langle PAR \rangle$$

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

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

$$\int_{-a}^{a} \langle IMPAR \rangle = 0. \qquad \int_{-a}^{a} \langle PAR \rangle = 2 \int_{0}^{a} \langle PAR \rangle \neq 0.$$

$$C = \frac{a_0}{2} \qquad a_0 = \left(\frac{1}{L}\right)\int_{-L}^{L} f(t)\,dt$$

$$f(t) = \begin{cases} \text{IMPAR} & a_0 = 0 \\ \text{PAR} & a_0 = \frac{2}{L}\int_{0}^{L} f(t)\,dt \end{cases}$$

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

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

$$f(t) = \begin{cases} \text{IMPAR} \rightarrow a_n = 0 \\ \text{PAR} \rightarrow a_n = \frac{2}{L}\int_{0}^{L} f(t)\cos\left(n\frac{\pi}{L}t\right)dt \end{cases}$$

$$b_n = \left(\frac{1}{L}\right)\int_{-L}^{L} f(t)\,\text{sen}\left(\frac{n\pi}{L}t\right)dt$$

$$f(t) = \begin{cases} \text{IMPAR} \quad b_n = \left(\frac{2}{L}\right)\int_{0}^{L} f(t)\,\text{sen}\left(\frac{n\pi}{L}t\right)dt \\ \text{PAR} \quad b_n = 0. \end{cases}$$

SERIE COSENO

PAR $$f(t) = C + \sum_{n=1}^{\infty} \left(a_n \cos\left(\frac{n\pi t}{L}\right) \right)$$

SERIE SENO.

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