SERIE TRIG. DE FOURIER

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

$-L < x < L$

$$C = \frac{a_0}{2} \qquad a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx$$

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

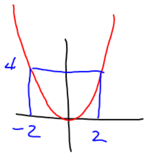
$$b_n = \frac{1}{L}\int_{-L}^{L} f(x)\operatorname{sen}\left(\frac{n\pi}{L}\right)x\,dx$$

$f(x) \longrightarrow$ PAR

$f(-x) = f(x)$

$f(x) = x^2$

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

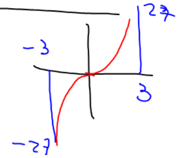


$f(x) \longrightarrow$ IMPAR

$f(-x) = -f(x)$

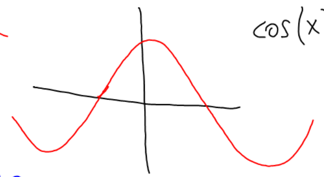
$f(x) = x^3$

$(-3)^2 = -(3)^2$



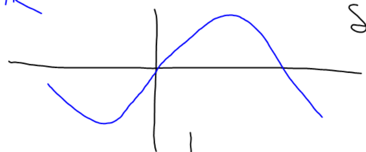
PAR

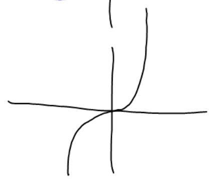
$\cos(x)$



IMPAR

$\operatorname{sen}(x)$





[PAR] x [PAR] = [PAR]

[PAR] x [IMPAR] = [IMPAR]

[IMPAR] x [IMPAR] = [PAR]

$$\int_{-L}^{L} [IMPAR]\,dx = 0 \qquad \int_{-L}^{L} [PAR]\,dx = 2\int_{0}^{L} [PAR]\,dx$$

$$a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx \Rightarrow \int_{-L}^{L} [IMPAR]\,dx = 0$$

$$a_n = \frac{1}{L}\int_{-L}^{L} f(x)\cos\left(\frac{n\pi}{L}x\right)dx \Rightarrow \int_{-L}^{L} [IMPAR][PAR]\,dx = 0$$

$$b_n = \frac{1}{L}\int_{-L}^{L} f(x)\,\text{sen}\left(\frac{n\pi}{L}x\right)dx \Rightarrow \int_{-L}^{L} [IMPAR]\times[IMPAR]\,dx \neq 0.$$

$f(x)$ IMPAR

$$f(x) = \sum_{n=1}^{\infty} b_n\,\text{sen}\left(\frac{n\pi}{L}x\right)dx$$

SERIE SENO

$$a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx \neq 0$$

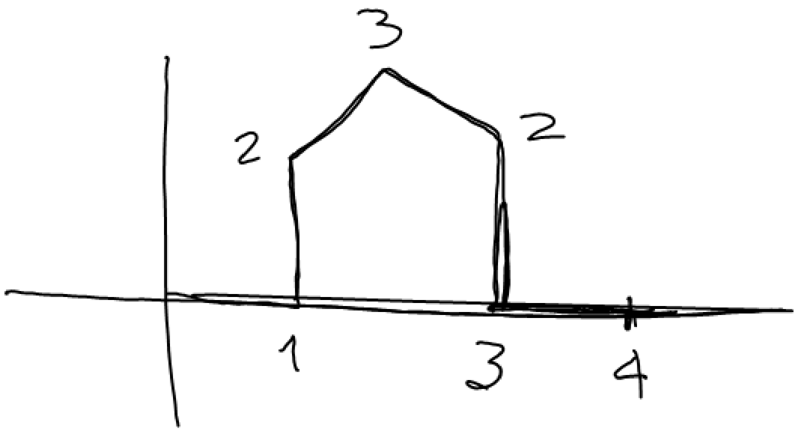
$$a_n \neq 0$$

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

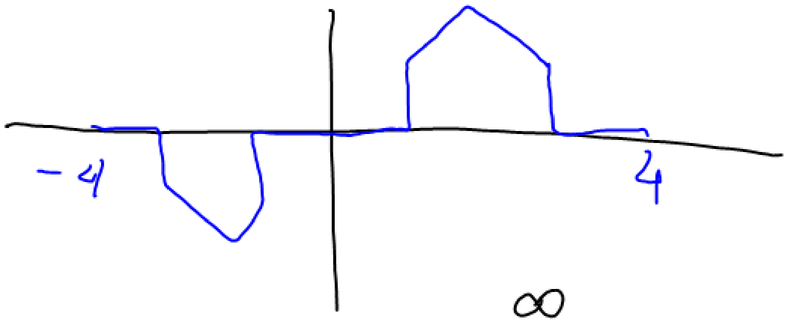
PAR

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

SERIE COSENO



$L = 4$



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

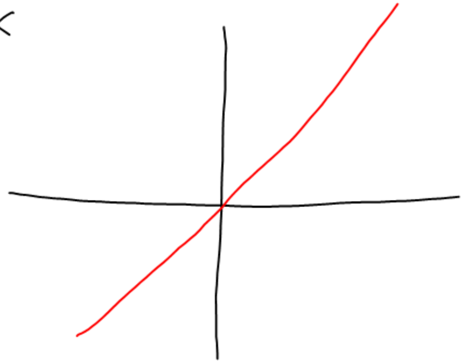
$f(x) = |x|$

PAR

$|-x| = |x|$

$f(x) = x$

IMPAR



$f(x) = c$

PAR

$f(x) = x^2 - 6x + 8$

$g = x^2 + 8$ par

$h = -6x$

$f(x) = 2e^{2x}$