SERIE TRIGONOMÉTRICA DE FOURIER

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

$f(x)$ { SIMETRÍA

PAR $\longrightarrow x^2$

IMPAR $\longrightarrow x^3$

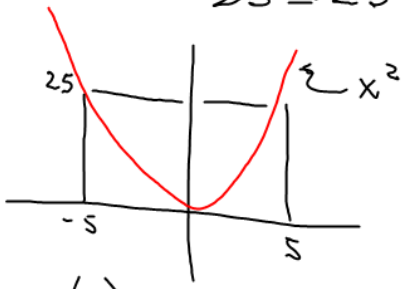
SIN SIMETRÍA $\longrightarrow e^x$

PAR

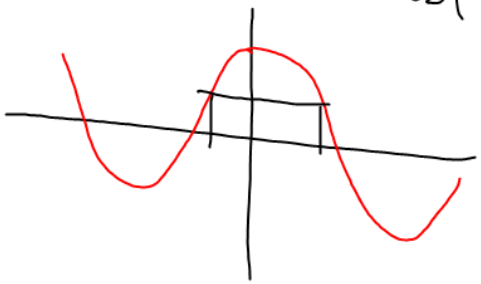
$a \le x \le b \qquad f(-x) = f(x)$

$-10 \le x \le 10 \qquad (-5)^2 = (5)$

$25 = 25$



PAR $\Rightarrow \cos(x)$ $\qquad \cos(-x) = \cos(x)$



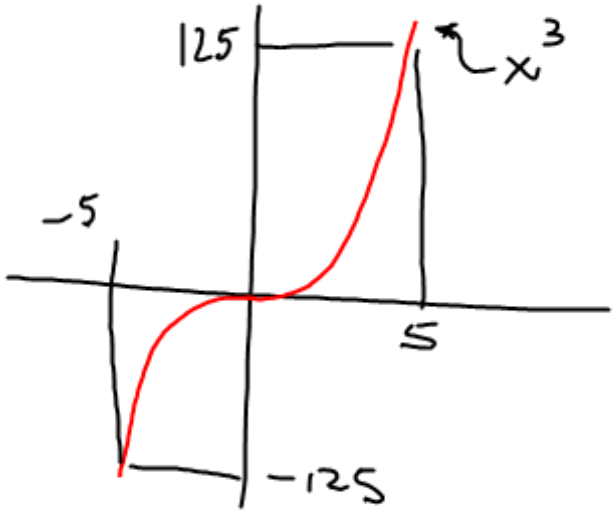
IMPAR

$a \leq x \leq b$

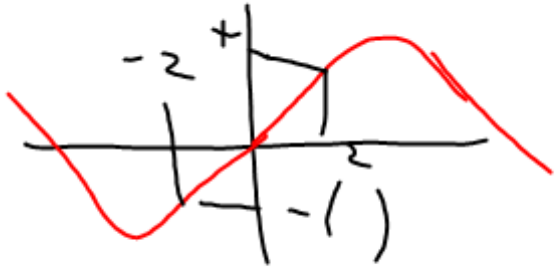
$f(-x) = -f(x)$

$(-5)^3 = -(5)^3$

$-125 = -(125)$



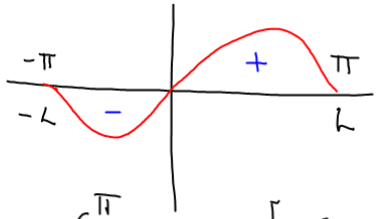
IMPAR $\Rightarrow$ Sen(x)



PROPIEDAD SIMETRÍAS.

$$\langle PAR\rangle\langle PAR\rangle \Leftrightarrow \langle PAR\rangle$$
$$\langle IMPAR\rangle\langle IMPAR\rangle \Leftrightarrow \langle PAR\rangle$$
$$\langle PAR\rangle\langle IMPAR\rangle \Leftrightarrow \langle IMPAR\rangle$$

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



$$\int_{-\pi}^{\pi}\operatorname{sen}(x)\,dx = 0$$

$$\int_{-\pi}^{\pi}\operatorname{sen}(x)\,dx = \Big[\int \operatorname{sen}(x)\,dx\Big]_{-\pi}^{\pi}$$

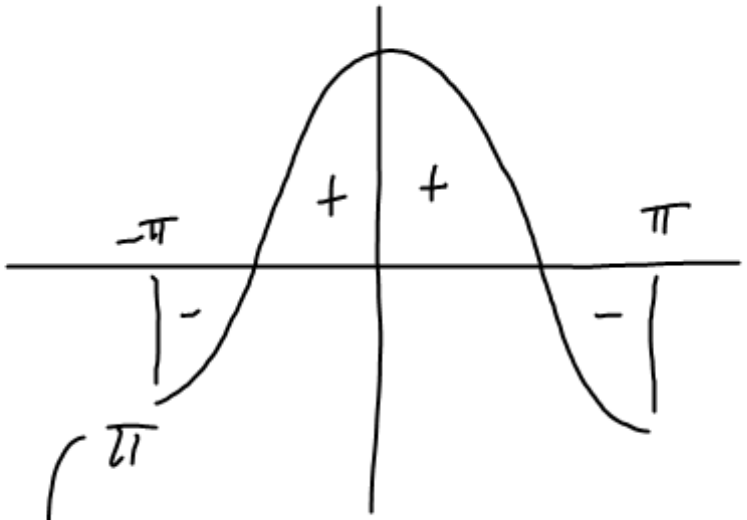
$$= \Big[-\cos(x)\Big]_{-\pi}^{\pi}$$

$$= -\Big(\cos(\pi) - \cos(-\pi)\Big)$$

$$= -(1-1)$$

$$\int_{-\pi}^{\pi}\operatorname{sen}(x)\,dx = -(0) \Rightarrow (0)$$

$$\int_{-\pi}^{\pi} \cos(x)\,dx$$



$$\int_{-\pi}^{\pi} \cos(x)\,dx = 2\int_{0}^{\pi} \cos(x)\,dx$$

$f(x) \longrightarrow$ PAR $\qquad x^2 \quad \cos(x) \quad |x|$

$$a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx \qquad a_0 = \frac{2}{L}\int_{0}^{L} f(x)\,dx$$

$$C = \frac{a_0}{2} \neq 0.$$

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

$\langle PAR \rangle \quad \langle PAR \rangle$

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

$\langle PAR \rangle \quad \langle IMPAR \rangle$

$\langle PAR \rangle$

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

SERIE. COSENO.

$\langle IMPAR \rangle$

$f(x)$

$$a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx = 0 \qquad C = \frac{a_0}{2} \Rightarrow (0)$$

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

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

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

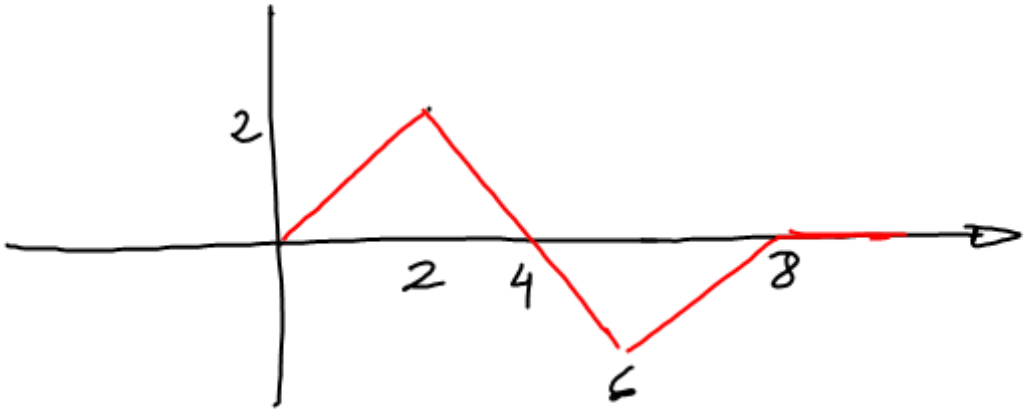
$\langle IMPAR \rangle \langle IMPAR \rangle$

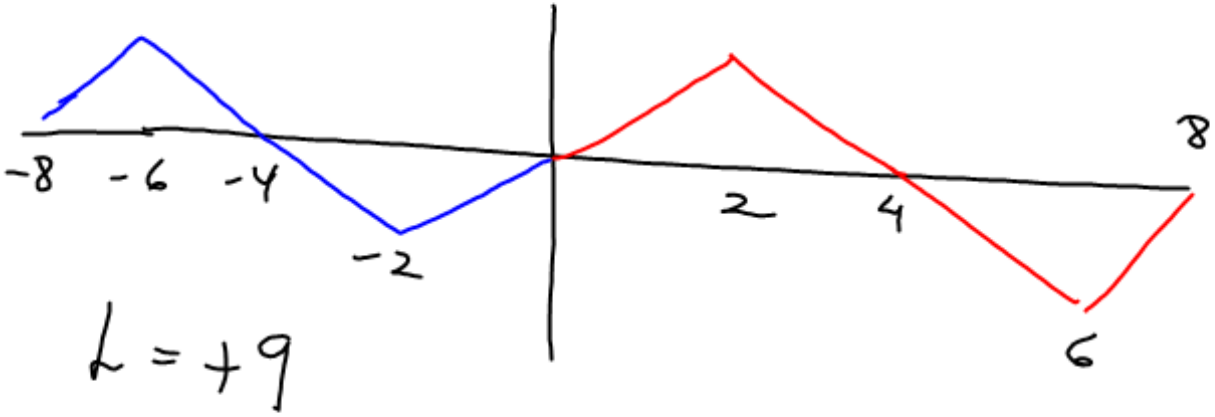
$\langle PAR \rangle$

STF $\langle IMPAR \rangle$

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

SERIE SENO.





$L = +9$

SERIE 5 - (cap. V)

Buscar a partir de Jueves 14 en la página del Departamento de Ecuaciones Diferenciales en la serie grupal.

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para entregar el miércoles 20.
