

Series de Fourier

Supongamos:

$f(t)$ integrable en $\left[t_0 - \frac{T}{2}; t_0 + \frac{T}{2}\right]$ y
período T .

entonces,

$$f(t) = \frac{a_0}{2} + \sum_{n=1}^{\infty} \left[a_n \cos\left(\frac{2n\pi}{T}t\right) + b_n \operatorname{sen}\left(\frac{2n\pi}{T}t\right) \right]$$

$$a_n = \frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \cos\left(\frac{2n\pi}{T}t\right) dt$$

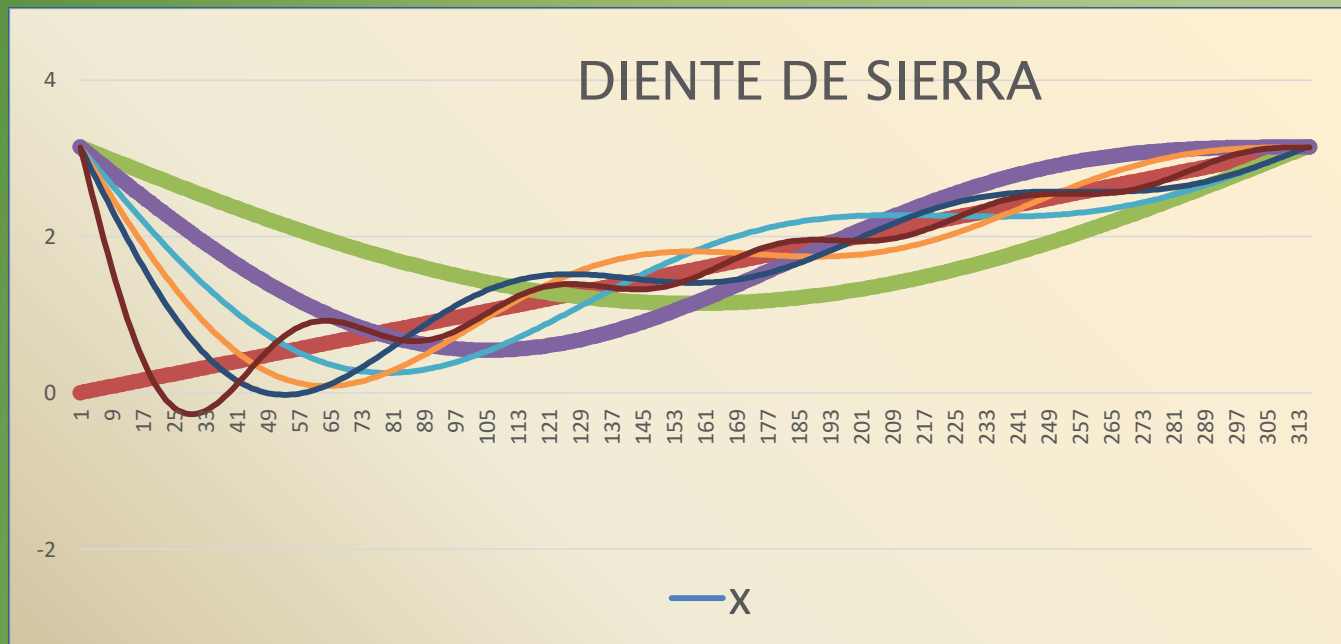
$$b_n = \frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \operatorname{sen}\left(\frac{2n\pi}{T}t\right) dt$$

Series de Fourier

Ejemplo 1:

Función diente de sierra

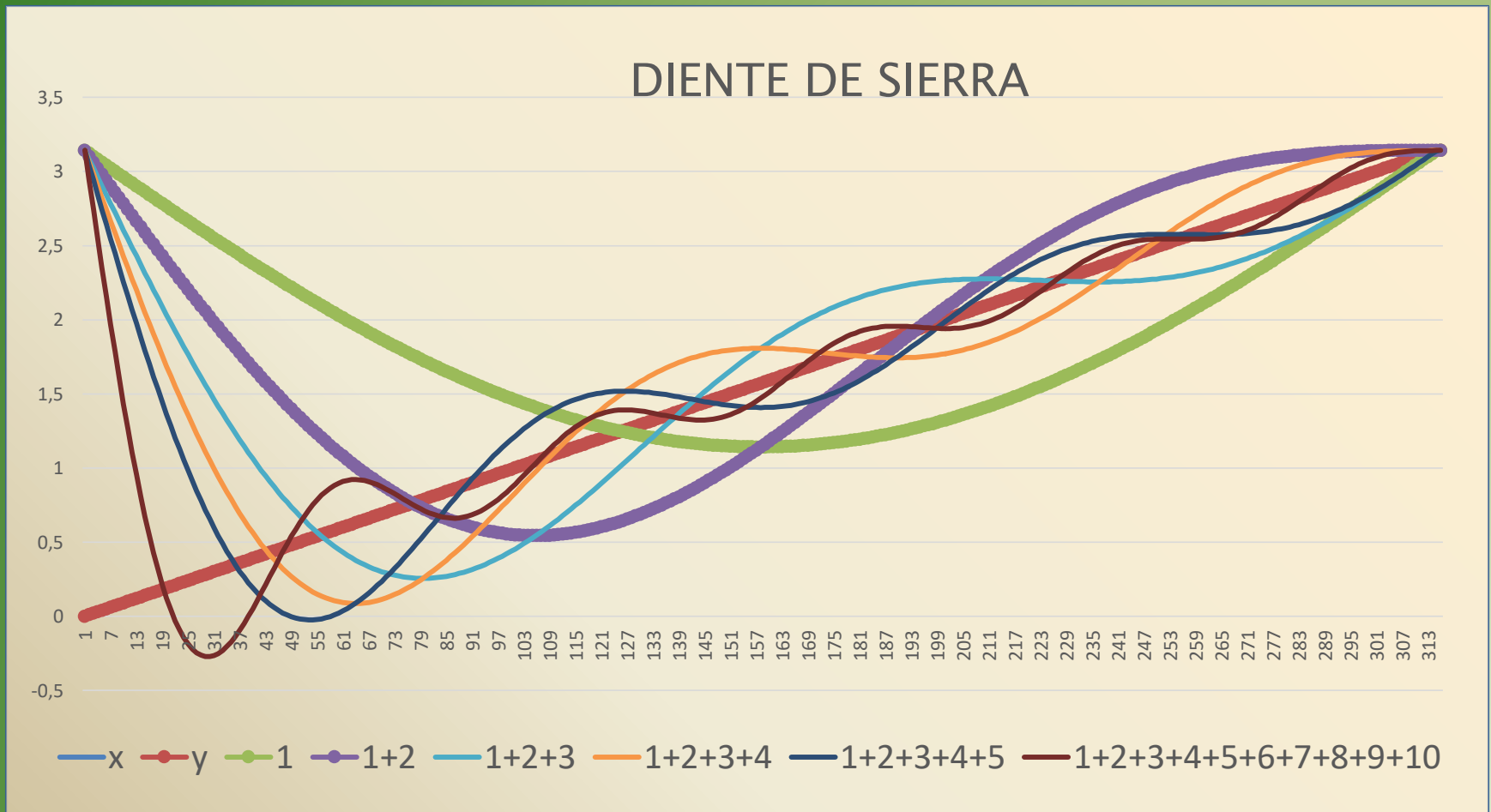
$$y = x \text{ para } 0 < x < \pi$$



Series de Fourier

Desarrollo:

$$y = \pi - 2\left(\text{sen}x + \frac{\text{sen}2x}{2} + \frac{\text{sen}3x}{3} + \dots\right)$$



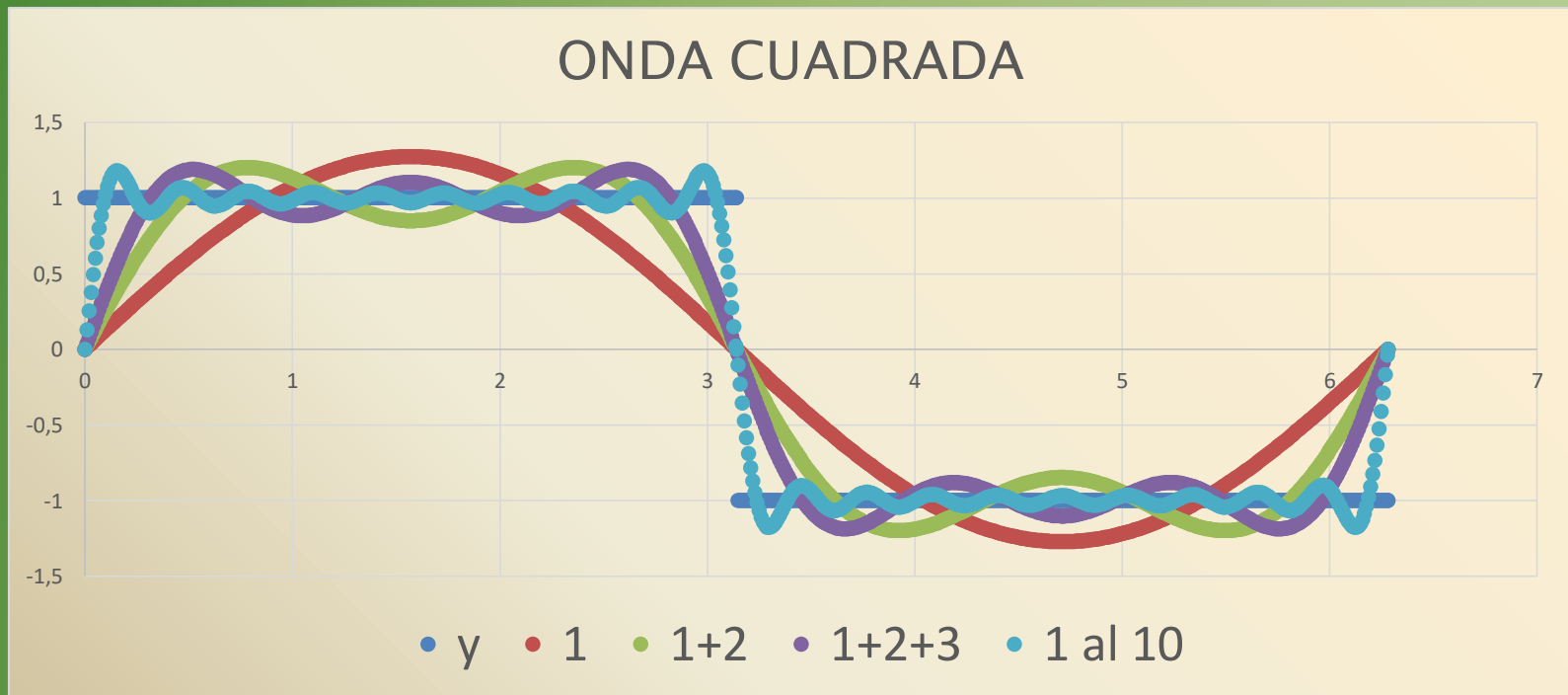
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Ejemplo 2:

Función onda cuadrada

$$y = 1 \text{ para } 0 < x < \pi$$

$$y = -1 \text{ para } \pi < x < 2\pi$$



Series de Fourier

Desarrollo:

$$y = \frac{4}{\pi} \left(\text{sen}x + \frac{\text{sen}3x}{3} + \frac{\text{sen}5x}{5} \dots \right)$$

ONDA CUADRADA

