

A dark blue vertical bar runs down the left side of the page. A blue arrow-shaped banner points to the right from this bar, containing the date. Below the banner, several thin, curved lines in dark blue and light grey sweep upwards from the bottom left corner.

17-3-2021

Participación 1.2

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$$f(t) = \begin{cases} -e^{-t} & -\pi < t < 0 \\ e^{-t} & 0 < t < \pi \end{cases} + 1$$

$$T = 2\pi$$

$$\omega_0 = 1$$

$f(t)$ es impar

$$b_n = \frac{1}{\pi} \int_{-\pi}^0 -e^{-t} \sin(nt) dt + \frac{1}{\pi} \int_0^{\pi} e^{-t} \sin(nt) dt$$

$$= -\frac{1}{\pi} \left[\frac{e^{-t}(\sin(nt) - n \cos(nt))}{1+n^2} \right]_{-\pi}^0 + \frac{1}{\pi} \left[\frac{e^{-t}(-\sin(nt) - n \cos(nt))}{1+n^2} \right]_0^{\pi}$$

$$= -\frac{n}{\pi} \left[\frac{1 + e^{-t} \cos(nt)}{1+n^2} \right]_{-\pi}^0 + \frac{n}{\pi} \left[\frac{1 - e^{-t} \cos(nt)}{1+n^2} \right]_0^{\pi}$$

$$= -\frac{n}{\pi} \left(\frac{1 + e^{-\pi} \cos(n\pi)}{1+n^2} \right) + \frac{n}{\pi} \left(\frac{1 - e^{-\pi} \cos(n\pi)}{1+n^2} \right) = \frac{-2n(1 - e^{-\pi} \cos(n\pi))}{\pi(1+n^2)}$$

$$f(t) = 1 - \frac{2}{\pi} \sum_{n=1}^{\infty} \frac{n(1 - e^{-\pi} \cos(n\pi))}{1+n^2} \sin(nt)$$

$$f(t) = 1 - \frac{2}{\pi} \sum_{n=1}^{1000} \frac{n(1 - e^{-\pi} \cos(n\pi))}{1+n^2} \sin(nt)$$

