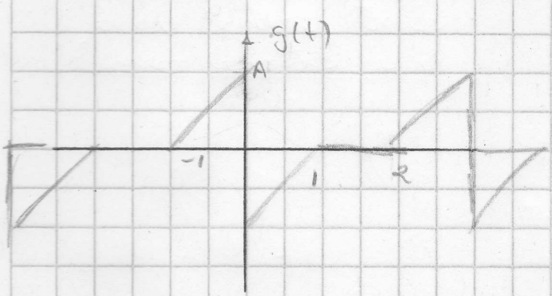
Practica I

Encuentre la SiTF de la señal mostrada



$$g(t) = \begin{cases} t+A, & -1 < t < 0 \\ t-A, & 0 < t < 1 \\ 0, & 1 < t < 2 \\ g(t+2), & \text{para otro caso} \end{cases}$$

$T = 2-(-1) = 3$

$\omega_0 = 2\pi/3$

Como $g(t)$ es una señal impar $a_0 = a_n = 0$

$$b_n = \frac{2}{T}\int_{-1}^{2} g(t)\,\text{Sen}\, n\omega t\, dt = \frac{4}{T}\int_0^1 t-A\ \text{Sen}\ n\omega t + \int_1^2 0\ \text{Sen}\, n\omega t\, dt$$

$$b_n = \frac{4}{3}\int_0^1 t\,\text{Sen}\, n\omega t - A\int_0^1 \text{Sen}\, n\omega t = \frac{4}{3}\left[\left(\frac{\text{Sen}\, n\omega t}{(n\omega)^2} - \frac{t\cos n\omega t}{n\omega}\right)\Big|_0^1 - A\left(-\frac{\cos n\omega t}{n\omega}\right)\Big|_0^1\right]$$

$$b_n = \frac{4}{3}\left[\frac{\text{Sen}\, n\omega}{(n\omega)^2} - \frac{\cos n\omega}{n\omega} + \frac{A\cos n\omega}{n\omega} - \frac{A}{n\omega}\right.$$

$$b_n = \frac{4}{3}\left[\frac{\text{Sen}\frac{2n\pi}{3}}{\left(\frac{2n\pi}{3}\right)^2} - \frac{\cos n\omega + A\cos n\omega - A}{n\omega}\right]$$

general

$$f(t) = \sum_{n=1}^{\infty}\frac{4}{3}\left[\frac{\text{Sen}\frac{2n\pi}{3}}{\left(\frac{2n\pi}{3}\right)^2} + \frac{3\left(-\cos\left(\frac{2n\pi}{3}\right) + A\cos\left(\frac{2n\pi}{3}\right) - A\right)}{2n\pi}\right]\text{Sen}\,\frac{2n\pi}{3}$$

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* Si $A = 1$

$$b_n = \frac{4}{3}\left[\frac{\text{Sen}\frac{2n\pi}{3}}{\left(\frac{2n\pi}{3}\right)^2} - \frac{3}{2n\pi}\right]$$

y

$$f(t) = \sum_{n=1}^{\infty}\frac{4}{3}\left[\frac{\text{Sen}\frac{2n\pi}{3}}{\left(\frac{2n\pi}{3}\right)^2} - \frac{3}{2n\pi}\right]\text{Sen}\,\frac{2n\pi}{3}$$

Scribe