# Simulación de la gráfica por series de Fourier

Función propuesta:
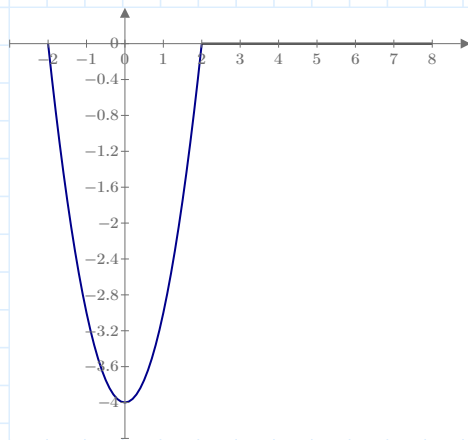
$$\begin{bmatrix} t^2 + 4 & -2 \leq t \leq 2 \\ 0 & 2 \leq t \leq 8 \end{bmatrix}$$

$t_1 := -2, -1.9 .. 2$

$t_2 := 2, 2.1 .. 8$

$f_1(t_1) := t_1^2 - 4$

$f_2(t_2) := 0$



$f_1(t_1)$

$f_2(t_2)$

$t_1$

$t_2$

$T := 10 \qquad k := 10000 \qquad d_1 := 2 \qquad d_2 := 3 \qquad r := 0.01$

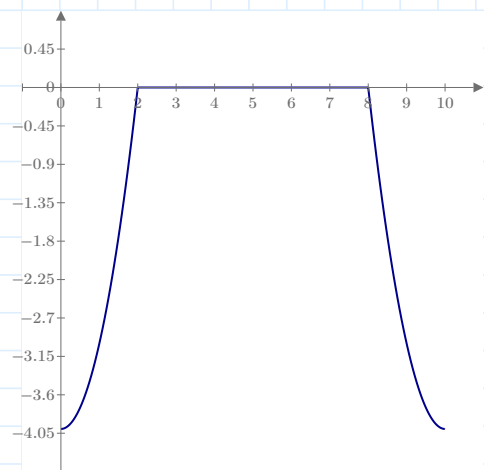$t_4 := -d_1 \cdot T, -d_1 \cdot T + r .. d_2 \cdot T \qquad\qquad t_5 := 0, r .. T$

$w := \dfrac{2\,\pi}{T} \qquad a_0 := \dfrac{-32}{15} \qquad n := 1, 2 .. k$

$a_n(n) := \dfrac{1}{5}\left(\dfrac{5}{n \cdot \pi}\right)^2 \cdot \left(8\,\cos\left(\dfrac{2\,\pi \cdot n}{5}\right) - \dfrac{20}{\pi \cdot n}\,\sin\left(\dfrac{2\,\pi \cdot n}{5}\right)\right)$
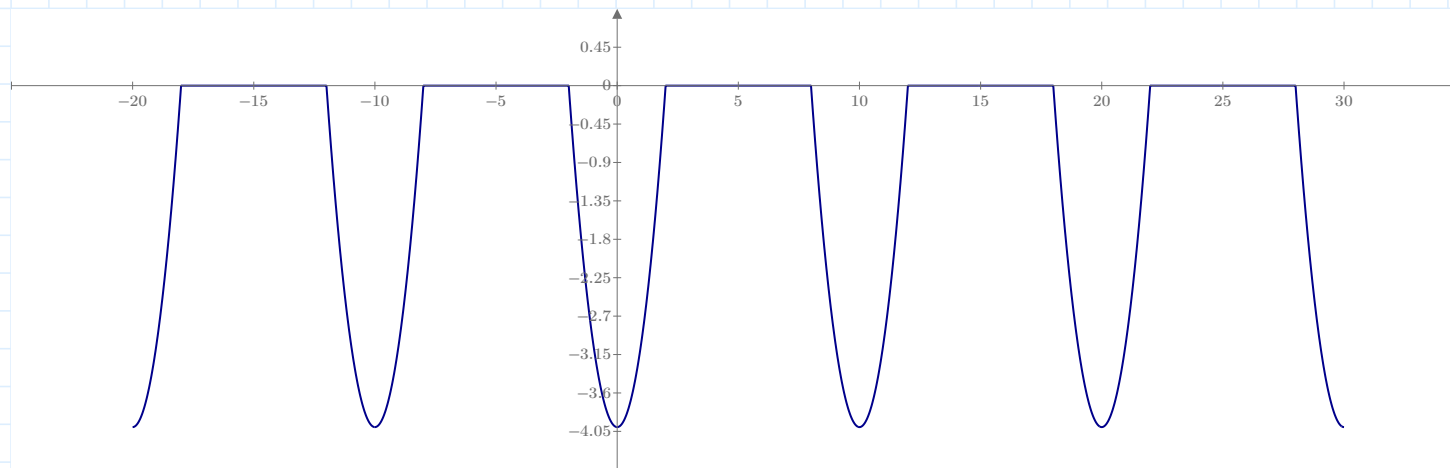
$b_n(n) := 0$

$f(t) := \dfrac{a_0}{2} + \displaystyle\sum_{n=1}^{k}\left(a_n(n) \cdot \cos\left(n \cdot w \cdot t\right) + b_n(n) \cdot \sin\left(n \cdot w \cdot t\right)\right)$

$f(t_5)$

$t_5$



$f(t_4)$

$t_4$

$$m := 1, 2 .. 15$$

$$c(m) := \frac{1}{2} \cdot \sqrt[2]{\left(a_n(|m|)\right)^2 + \left(b_n(|m|)\right)^2}$$

$$\phi(m) := \operatorname{atan}\left(\frac{-b_n(|m|)}{a_n(|m|)}\right)$$

$$\omega(m) := m \cdot w$$



$c(m)$

$\dfrac{a_0}{2}$

$c(-m)$

$\omega(m)$

$0$

$\omega(-m)$

$\phi(m)$

$\phi(-m)$

$\omega(m)$

$\omega(-m)$