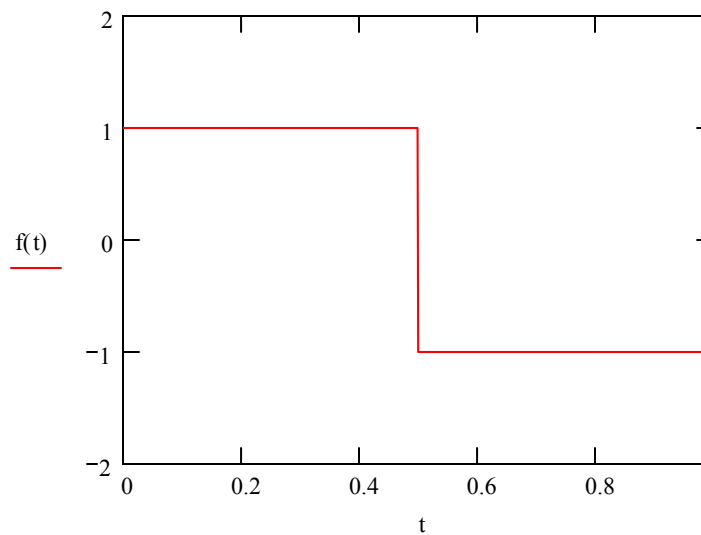


Square Wave Fourier Series Representation

function definition:

$$T := 1 \quad \text{period} \quad t := 0, \frac{T}{1000} .. T$$

$$f(t) := \begin{cases} 1 & \text{if } 0 \leq t \leq \frac{T}{2} \\ -1 & \text{if } \frac{T}{2} \leq t \leq T \end{cases}$$



Fourier series representation:

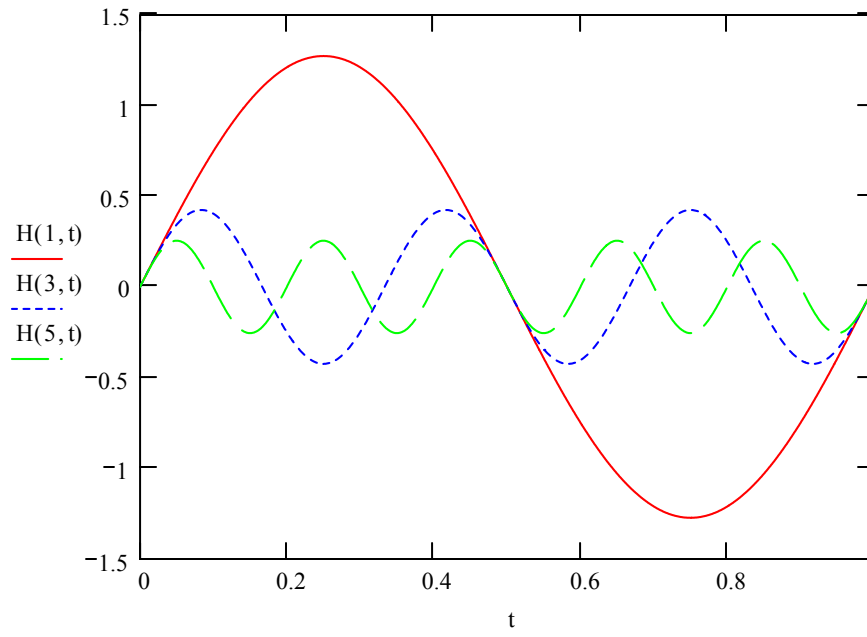
$$\omega_0 := \frac{2 \cdot \pi}{T} \quad \text{fundamental frequency}$$

$$B(i) := \frac{2}{i \cdot \pi} (1 - \cos(i \cdot \pi)) \quad \text{harmonic amplitude}$$

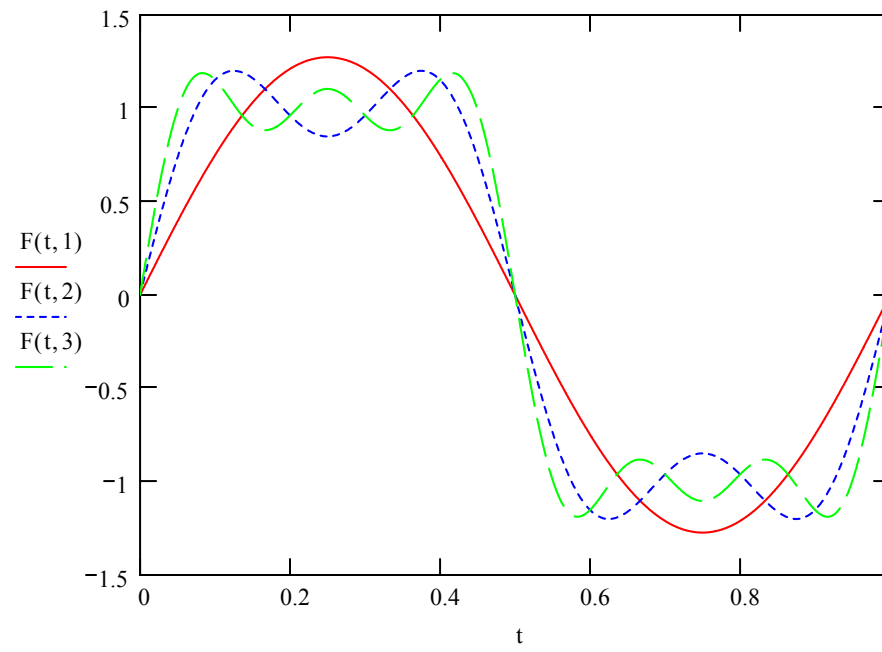
$$H(i, t) := B(i) \cdot \sin(i \cdot \omega_0 \cdot t) \quad \text{harmonic}$$

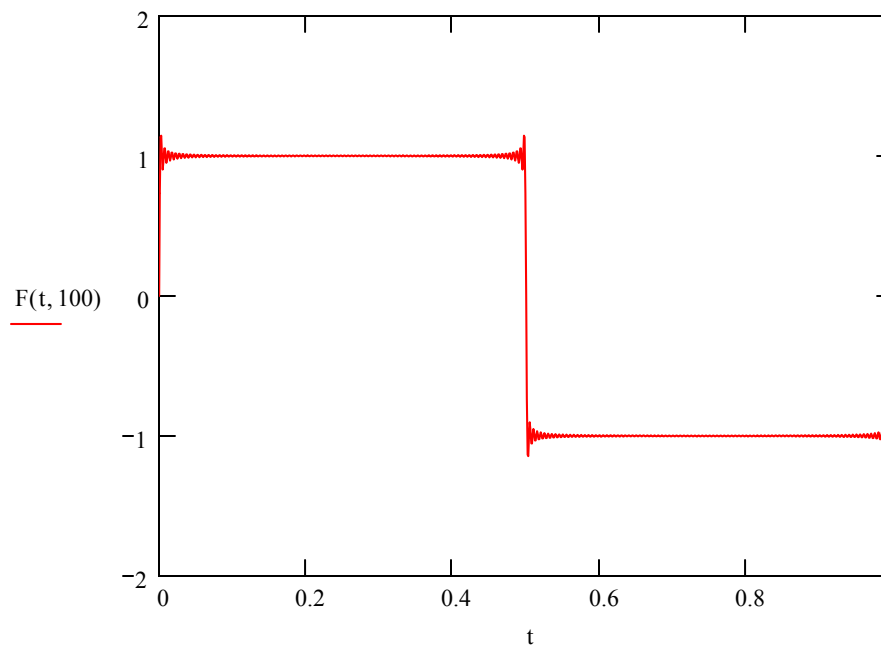
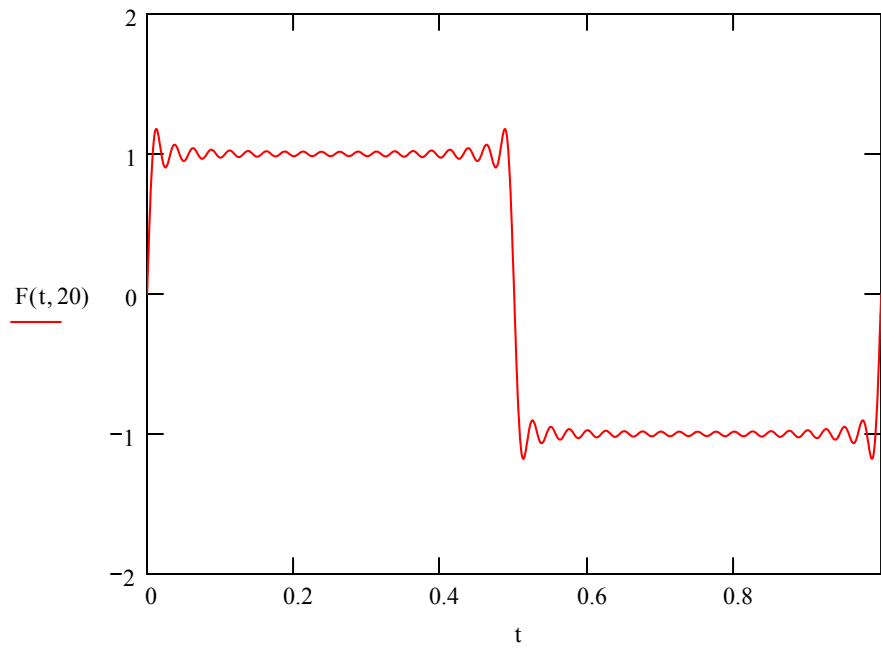
$$F(t, n) := \sum_{i=1}^n \left[\frac{4}{(2 \cdot i - 1) \cdot \pi} \cdot \sin[(2 \cdot i - 1) \cdot \omega_0 \cdot t] \right] \quad \text{Fourier series}$$

individual harmonics:



combination of harmonics:





spectrum:

$i := 1..13$

use Format-Graph-XY Plot-Traces-Type-bar to format graph as histogram

