

A Fourier series example¹

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The Fourier series for

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

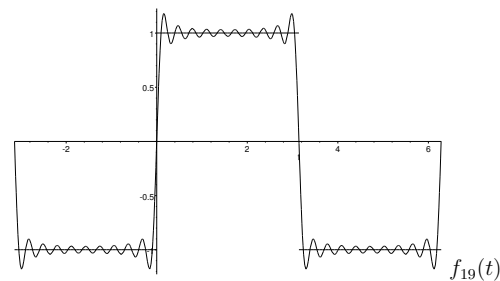
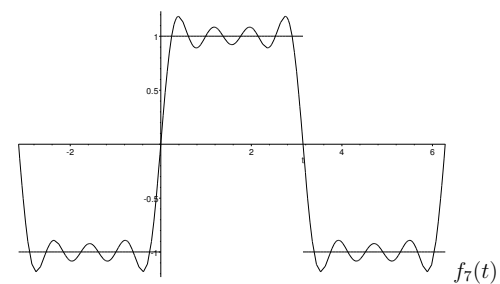
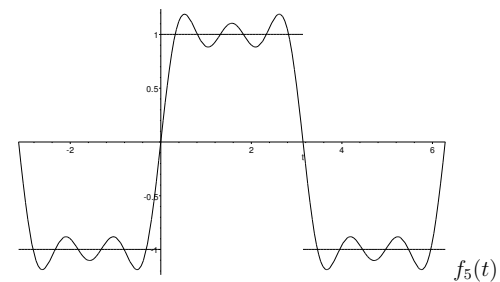
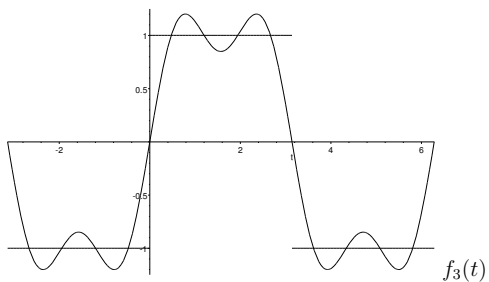
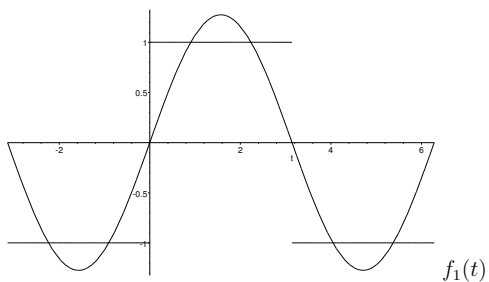
with $f(t + 2\pi) = f(t)$ is

$$f(t) = \frac{4}{\pi} \sum_{n \text{ odd}} \frac{1}{n} \sin nt \quad (2)$$

If we write

$$f_N(t) = \frac{4}{\pi} \sum_{n \text{ odd}, n \leq N} \frac{1}{n} \sin nt \quad (3)$$

then



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