

In-Class Exercise: Fourier Series Calculation of a Square Wave.

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In the continuous case, on the interval $[0, 2\pi]$, the Fourier series can be written as:

$$f(t) = c_0 + \sum_{n=1}^{\infty} a_n \cos(nt) + b_n \sin(nt) \quad (1)$$

with coefficients:

$$c_0 = \frac{1}{2\pi} \int_0^{2\pi} f(t) dt \quad (2)$$

$$a_n = \frac{1}{\pi} \int_0^{2\pi} f(t) \cos ntdt \quad (3)$$

$$b_n = \frac{1}{\pi} \int_0^{2\pi} f(t) \sin ntdt \quad (4)$$

Calculate the Fourier Coefficients of the continuous square wave function shown in Fig. 1.

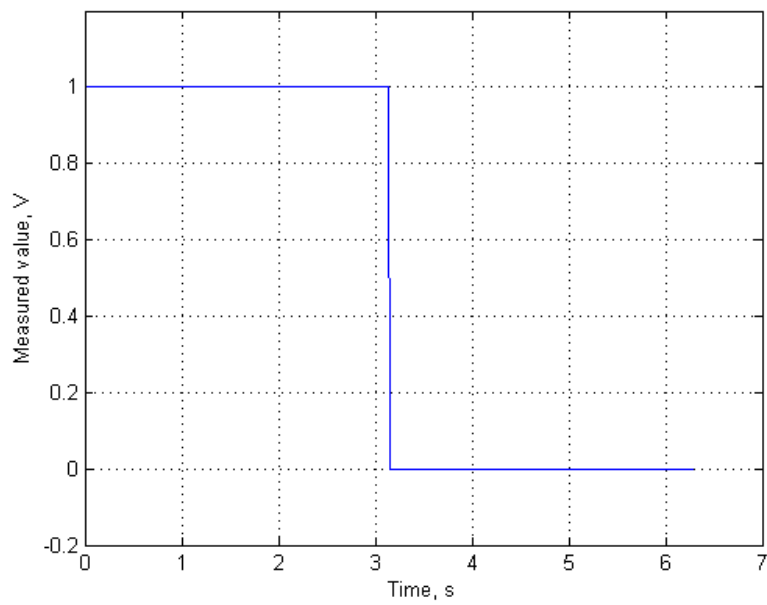


Figure 1: Square wave function defined on the interval $[0, 2\pi]$.