

Fourier Transform

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- The series can be represented as a sum of sinusoidal signals:

$$f(t) = \sum_{-\infty}^{\infty} C_n e^{jn\omega_0 t}, \quad C_n = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) e^{-jn\omega_0 t} dt$$

- As $T \rightarrow \infty$, $\frac{1}{T} \rightarrow \frac{d\omega}{2\pi}$
- The Fourier transform is written as:

$$F(\omega) = \mathcal{F}\{f(t)\} = \int_{-\infty}^{\infty} f(t) e^{-j\omega t} dt$$