Fourier Transform

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

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

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

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