Definition 11.24 The Fourier transform of a signal $g(t)$ is defined as

$$G(f) = \int_{-\infty}^{\infty} g(t) e^{-j2\pi f t} dt.$$

The signal $g(t)$ can be recovered from $G(f)$ as

$$g(t) = \int_{-\infty}^{\infty} G(f) e^{j2\pi f t} df,$$

and $g(t)$ is called the inverse Fourier transform of $G(f)$. The functions $g(t)$ and $G(f)$ are said to form a transform pair, denoted by

$$g(t) \rightleftharpoons G(f).$$

The variables t and f are referred to as time and frequency, respectively.