$h(t) \in \mathbb{R}$	$\overline{H(\omega)} = H(-\omega)(H(\omega)$ is Hermitian$)$
$h(t) \in \mathbb{I}$	$\overline{H(\omega)} = -H(-\omega)$
$h(t) = h(-t)(h(t)$ is even$)$	$H(\omega) = H(-\omega)(H(\omega)$ is even$)$
$h(t) = -h(-t)(h(t)$ is odd$)$	$H(\omega) = -H(-\omega)(H(\omega)$ is odd$)$
$h(t) \in \mathbb{R} \wedge h(t) = h(-t)$	$H(\omega) \in \mathbb{R} \wedge H(\omega) = H(-\omega)$
$h(t) \in \mathbb{R} \wedge h(t) = -h(-t)$	$H(\omega) \in \mathbb{I} \wedge H(\omega) = -H(-\omega)$
$h(t) \in \mathbb{I} \wedge h(t) = h(-t)$	$H(\omega) \in \mathbb{I} \wedge H(\omega) = H(-\omega)$
$h(t) \in \mathbb{I} \wedge h(t) = -h(-t)$	$H(\omega) \in \mathbb{R} \wedge H(\omega) = -H(-\omega)$

24.9.4 Time and Complex Scaling and Shifting

The following are Fourier transform pairs:

- $h(\alpha t) \quad \leftrightarrow \quad \frac{1}{|\alpha|} H(\frac{\omega}{\alpha})$ (Time Scaling)
- $\frac{1}{|\gamma|} h(\frac{t}{\gamma}) \quad \leftrightarrow \quad H(\gamma\omega)$ (Frequency Scaling)
- $h(t-t_0) \quad \leftrightarrow \quad H(\omega)e^{i\omega t_0}$ (Time Shifting)
- $h(t)e^{i\omega_0 t} \quad \leftrightarrow \quad H(\omega-\omega_0)$ (Frequency Shifting)

24.9.5 Convolution

Let $g(t)$ and $h(t)$ be two functions defined in the time domain with their Fourier transforms as $G(\omega)$ and $H(\omega)$ respectively,

$$g(t) \leftrightarrow G(\omega) \tag{24.398}$$
$$h(t) \leftrightarrow H(\omega) \tag{24.399}$$

The convolution is defined in the time domain as follows,