

Time Domain versus Frequency Domain

$$f(t) \xrightarrow{\text{Fourier Transform}} F(\omega) = F_R(\omega) + iF_I(\omega), F(-\omega) = F^*(\omega)$$

Even function $\frac{f(t) + f(-t)}{2}$

Inverse Fourier Transform

Odd function $\frac{f(t) - f(-t)}{2}$

Inverse Fourier Transform

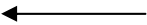
Special case: casual function

$$f(t) = \begin{cases} f^+(t), & t \geq 0 \\ 0, & t < 0 \end{cases}$$



Only $F_R(\omega)$ or $-F_I(\omega)$
can determine $f(t)$

Hilbert transform pair



Any constraint between
 $F_R(\omega)$ and $-F_I(\omega)$