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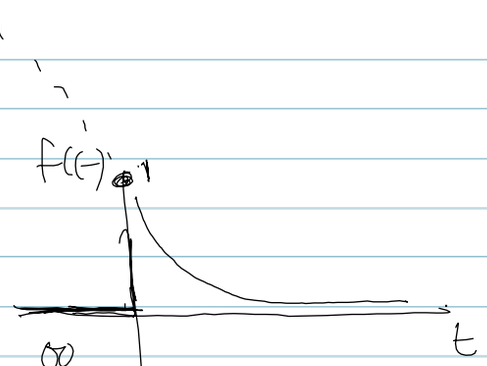
Example 2

$f(t) = e^{-t} u_0(t)$



$$\mathcal{F}\{e^{-t} u_0(t)\} = \int_0^{\infty} e^{-t} e^{-j\omega t}\, dt$$

$$= \int_0^{\infty} e^{-(j\omega+1)t}\, dt$$

$$= -\frac{1}{j\omega+1}\left[e^{-(j\omega+1)t}\right]_0^{\infty}$$

$$= -\frac{1}{j\omega+1}\left[0 - 1\right]$$

$$= \frac{1}{j\omega+1}$$

$e^{-t} u_0(t) \Longleftrightarrow \frac{1}{j\omega+1}$ $\quad \frac{1}{|j\omega+1|}$ $\quad \angle \frac{1}{j\omega+1}$