Example 5

$$\mathcal{L}\{e^{-at}u_0(t)\} = \frac{1}{s+a}$$

$$\mathcal{F}\{e^{-at}u_0(t)\}$$

$$F(s) = \frac{1}{s+a}$$

$$F(\omega) = \frac{1}{j\omega + a} \qquad F(j\omega)$$

Example 6

$$\mathcal{L}\{e^{-at}\cos\omega_0 t\, u_0(t)\} = \frac{s+a}{(s+a)^2+\omega_0^2}$$

$$F(\omega) \Leftrightarrow \frac{j\omega + a}{(j\omega+a)^2 + \omega_0^2}$$