

Teorema do valor inicial

$$\mathcal{L}\left\{\frac{df}{dt}\right\} = sF(s) - f(0^-) = \int_{0^-}^{\infty} e^{-st} \frac{df}{dt} dt$$

$$\lim_{s \rightarrow \infty} [sF(s) - f(0^-)] = \lim_{s \rightarrow \infty} \left(\int_{0^-}^{0^+} e^{-st} \frac{df}{dt} dt + \int_{0^+}^{\infty} e^{-st} \frac{df}{dt} dt + \right)$$

$$\int_{0^+}^{\infty} e^{-st} \frac{df}{dt} dt$$

$$- f(0^-) + \lim_{s \rightarrow \infty} [sF(s)] = \lim_{s \rightarrow \infty} [f(0^+) - f(0^-)]$$

$$- f(0^-) + \lim_{s \rightarrow \infty} [sF(s)] = f(0^+) - f(0^-)$$

$$f(0^+) = \lim_{s \rightarrow \infty} sF(s)$$

ou

$$\lim_{t \rightarrow 0^+} f(t) = \lim_{s \rightarrow \infty} [sF(s)]$$