Encontrar a transformada de Laplace de $f(t) = \cos t$.

$$\mathcal{L}\{f(t)\} = \int_0^{+\infty} f(t)e^{-st}\ dt = \int_0^{+\infty} e^{-st}\cos t\ dt = \left(e^{-st}\sin t\right)\Big|_0^{+\infty} + s\int_0^{+\infty} e^{-st}\sin t\ dt =$$

$$= (e^{-st}\sin t)|_0^{+\infty} - (se^{-st}\cos t)|_0^{+\infty} - s^2\underbrace{\int_0^{+\infty} e^{-st}\cos t\ dt}_{\mathcal{L}\{\cos t\}}$$

$$\mathcal{L}\{\cos t\} = \frac{(e^{-st}\sin t)|_0^{+\infty} - (se^{-st}\cos t)|_0^{+\infty}}{1+s^2}, \text{ que converge para } s > 0.$$

$$\boxed{\mathcal{L}\{\cos t\} = \frac{s}{1+s^2},\ s > 0}$$

Documento compilado em Thursday 13th March, 2025, 09:43, tempo no servidor.

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