$$Ecuacion := x(t) + \int_0^t \tau\, e^{2\tau}\, x(t-\tau)\, d\tau = t\, e^{2t}$$

$$x(t) + \left(te^{2t}\right) * x(t) = te^{2t}$$

$$\mathcal{L}\{x\} + \mathcal{L}\left\{ te^{2t} * x(t)\right\} = \mathcal{L}\{te^{2t}\}$$

$$\mathcal{L}\{x\} + \mathcal{L}\{te^{2t}\} \cdot \mathcal{L}\{x\} = \mathcal{L}\{te^{2t}\}$$

$$\mathcal{L}\{x\} + \frac{\mathcal{L}\{x\}}{(s-2)^2} = \left(\frac{1}{(s-2)^2}\right\}$$

$$\mathcal{L}\{x\}\left(1 + \frac{1}{(s-2)^2}\right) = \frac{1}{(s-2)^2}$$

$$\mathcal{L}\{x\}\left(\frac{(s-2)^2+1}{(s-2)^2}\right) = \frac{1}{(s-2)^2}$$

$$\boxed{\mathcal{L}\{x\} = \frac{1}{s^2-4s+5}}$$

propiedad

$$\mathcal{L}^{-1}\left\{F(s)\cdot G(s)\right\} = f(t) * g(t)$$

$$= \int_0^t f(\tau)\cdot g(t-\tau)\, d\tau.$$

$$\frac{d}{dt}\bar{X} = A\bar{X}$$

$$\mathcal{L}\left\{\frac{d}{dt}\bar{x}\right\} = A\,\mathcal{L}\{\bar{x}\}$$

$$s\mathcal{L}\{x\} - \bar{x}(0) = A\,\mathcal{L}\{\bar{x}\} \qquad \mathcal{L}\{\bar{x}\} = \begin{bmatrix} \mathcal{L}\{x_1\} \\ \mathcal{L}\{x_2\} \end{bmatrix}$$

$$s\mathcal{L}\{x\} - A\mathcal{L}\{x\} = \bar{X}(0)$$

$$\underbrace{(sI - A)}_{n\times n}\underbrace{\mathcal{L}\{\bar{x}\}}_{n\times 1} = \underbrace{\bar{x}(0)}_{n\times 1}$$

$$\mathcal{L}\{\bar{x}\} = (sI - A)^{-1}\bar{x}(0)$$

$$\bar{X}(t) = \mathcal{L}^{-1}\left\{(sI - A)^{-1}\right\}\bar{X}(0)$$

$$\bar{X}(t) = e^{At}\,\bar{X}(0)$$

$$\boxed{e^{At} = \mathcal{L}^{-1}\left\{(sI - A)^{-1}\right\}.}$$

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$$f(t) = c + \sum_{n=1}^{\infty}\left(a_n \cos\left(\frac{n\pi}{L}t\right) + b_n \sin\left(\frac{n\pi}{L}t\right)\right)$$

$$C = \frac{a_0}{2} \qquad a_0 = \frac{1}{L}\int_{-L}^{L} f(t)\,dt.$$

$$a_n = \frac{1}{L}\int_{-L}^{L} f(t)\cos\left(\frac{n\pi}{L}t\right)dt$$

$$b_n = \frac{1}{L}\int_{-L}^{L} f(t)\,\mathrm{sen}\left(\frac{n\pi}{L}t\right)dt.$$