TRANSFORMADA INVERSA ($\mathcal{L}^{-1}\{F(S)\}$) POR FRACCIONES PARCIALES

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Calcular la Tranformada Inversa $\mathcal{L}^{-1}\{F(S)\}$ de :

1) $F(s) = \frac{2}{S^2+S} = \frac{2}{s(s+1)}$

$$\frac{2}{s(s+1)} = \frac{A}{s} + \frac{B}{s+1} \rightarrow \frac{2}{s(s+1)} = \frac{A(s+1)+Bs}{s(s+1)} \rightarrow 2 = As + A + Bs$$

$$2 = s(A+B) + A \quad \left\{ \begin{array}{l} A+B = 0 \\ A = 2 \end{array} \right. \rightarrow \begin{array}{l} A = 2 \\ B = -2 \end{array}$$

- $F(s) = \frac{2}{s} - \frac{2}{s+1}$ ✓

$$\mathcal{L}^{-1}\{F(s)\} = \mathcal{L}^{-1}\left\{\frac{2}{s}\right\} - 2\,\mathcal{L}^{-1}\left\{\frac{1}{s+1}\right\} \quad a=-1$$

$$f(t) = 2 - 2e^{-t}$$

Calcular la Tranformada Inversa $\mathcal{L}^{-1}\{F(S)\}$ de :

2) $F(s) = \dfrac{S}{(S+1)(S^2+4)} = \dfrac{A}{s+1} + \dfrac{Bs+C}{s^2+4} = \dfrac{A}{s+1} + \dfrac{BS}{s^2+4} + \dfrac{C}{s^2+4}$

$$F(s) = \frac{-1/5}{s+1} + \frac{(1/5)\cdot S}{s^2+4} + \frac{4/5}{s^2+4}$$

$a = -1$ $\quad k = 2$ $\quad k = 2$ ✓

$\rightarrow \text{SEN}(kt) = \dfrac{k}{s^2+k^2}$

$$\mathcal{L}^{-1}\{F(s)\} = -\frac{1}{5}\mathcal{L}^{-1}\left\{\frac{1}{s+1}\right\} + \frac{1}{5}\mathcal{L}^{-1}\left\{\frac{S}{s^2+4}\right\} + \frac{4}{5}\cdot\frac{1}{2}\mathcal{L}^{-1}\left\{\frac{2}{s^2+4}\right\}$$

$$f(t) = -\frac{1}{5}e^{-t} + \frac{1}{5}\cos(2t) + \frac{2}{5}\text{SEN}(2t)$$