

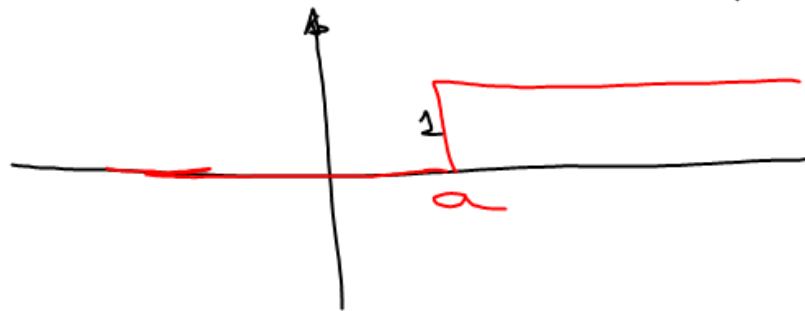
TEMA 3.-

1) MÉTODO DE LA TRANSFORMADA DE LAPLACE.

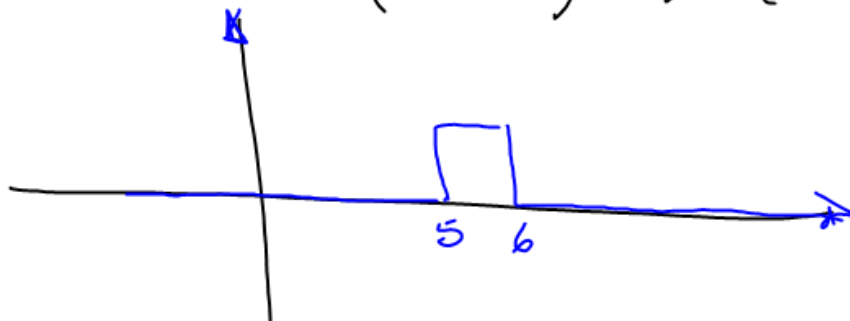
EDO(n) LCCNH con COND. INICIALES

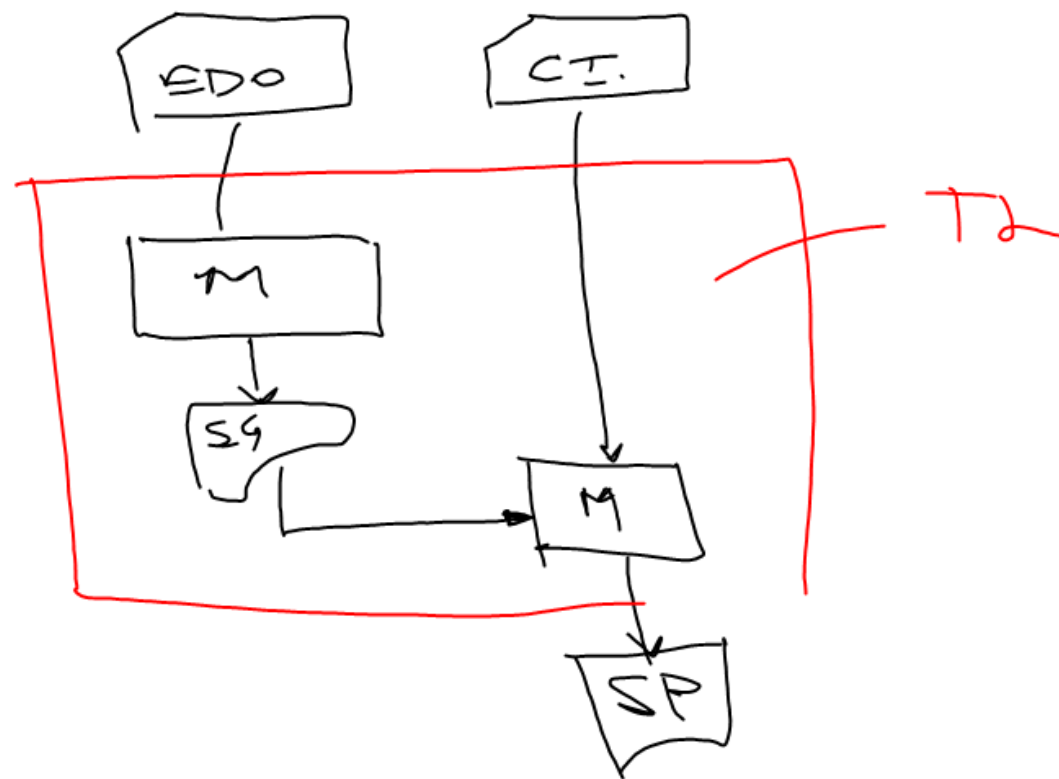
ESCALÓN UNITARIO

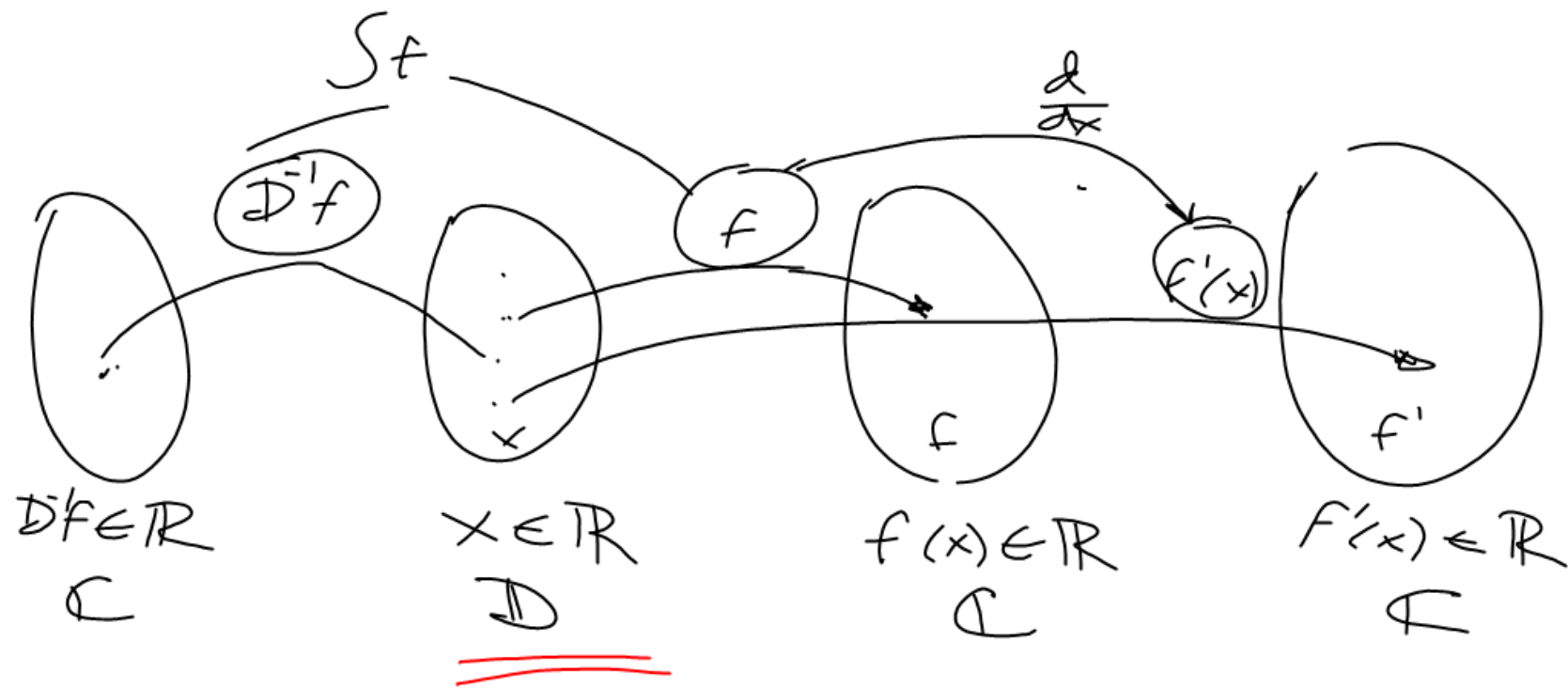
$$u(t-a) = \begin{cases} 0 & ; t < a \\ 1 & ; t \geq a \end{cases}$$

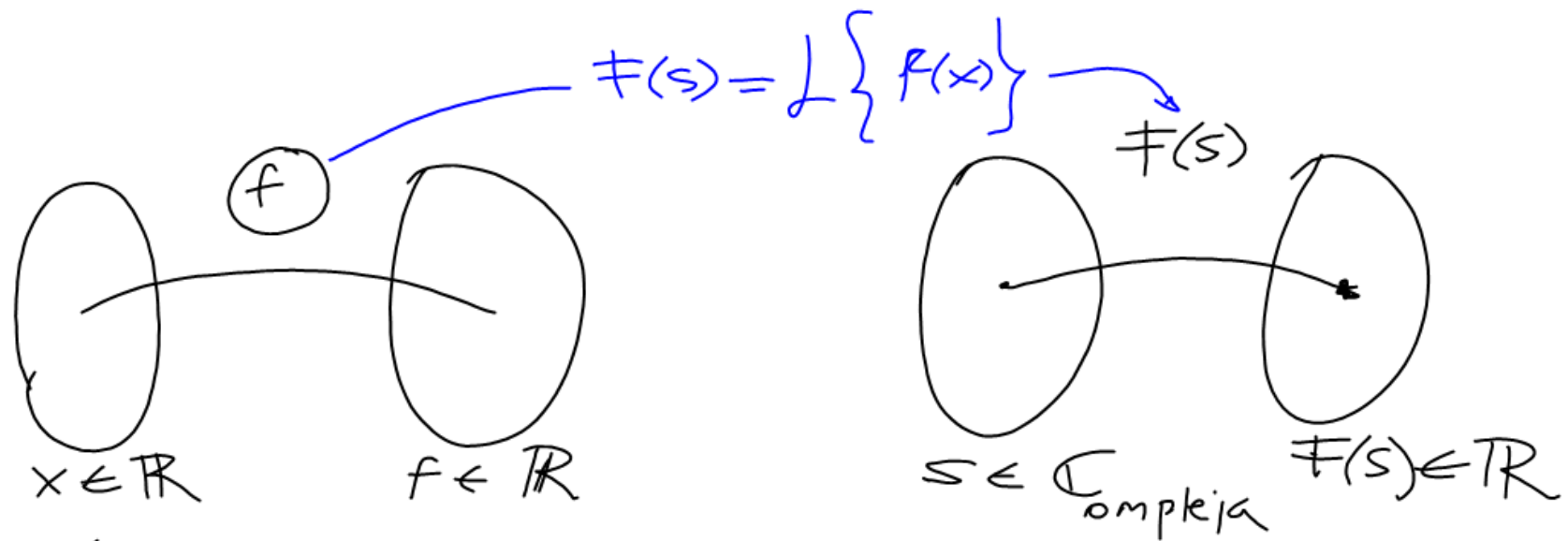


$$u(t-5) - u(t-6)$$









$$\begin{aligned} \mathcal{L}\{k_1 f + k_2 g\} &\longrightarrow k_1 F(s) + k_2 G(s) \\ \mathcal{L}\{f'(x)\} &\longrightarrow s F(s) - f(0) \\ \mathcal{L}\left\{\int f(x) dx\right\} &\longrightarrow \frac{F(s)}{s} \end{aligned}$$

$$F(s) = \int_0^{\infty} f(x) e^{-sx} dx$$

$$F(s) = \int_0^{\infty} f(t) e^{-st} dt$$

$$f(t) = 1$$

$$F(s) = \int_0^{\infty} (1) e^{-st} dt \Rightarrow \left[\int e^{-st} dt \right]_0^{\infty}$$

$$\lim_{t \rightarrow \infty} e^{-st}$$

$$\Rightarrow \left[-\frac{1}{s} \int -s e^{-st} dt \right]_0^{\infty}$$

$$\lim_{t \rightarrow \infty} \frac{1}{e^{+st}}$$

$$F(s) \Rightarrow \left[-\frac{1}{s} (e^{-st}) \right]_0^{\infty}$$

$$\lim_{b \rightarrow \infty} \frac{1}{b} = 0$$

$$F(s) = -\frac{1}{s} \left(\lim_{t \rightarrow \infty} e^{-st} - e^{-s(0)} \right)$$

$$F(s) = -\frac{1}{s} (-1) \Rightarrow \frac{1}{s}$$

$$\boxed{\mathcal{L}\{t^n\} = \frac{n!}{s^{n+1}}}$$

$$\frac{dx_1(t)}{dt} = x_1(t) + 2x_2(t) + 3x_3(t) + e^{2t}$$

$$\frac{dx_2(t)}{dt} = 4x_1(t) - 5x_2(t) + 6x_3(t) + t^2$$

$$\frac{dx_3(t)}{dt} = 7x_1(t) + 8x_2(t) + 9x_3(t) + \cos(2t)$$

$$\frac{d}{dt} \begin{bmatrix} x_1(t) \\ x_2(t) \\ x_3(t) \end{bmatrix} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \times \begin{bmatrix} x_1(t) \\ x_2(t) \\ x_3(t) \end{bmatrix} + \begin{bmatrix} e^{2t} \\ t^2 \\ \cos(2t) \end{bmatrix}$$

$$\frac{d}{dt} \bar{x}(t) = A \bar{x}(t) + \bar{b}(t)$$