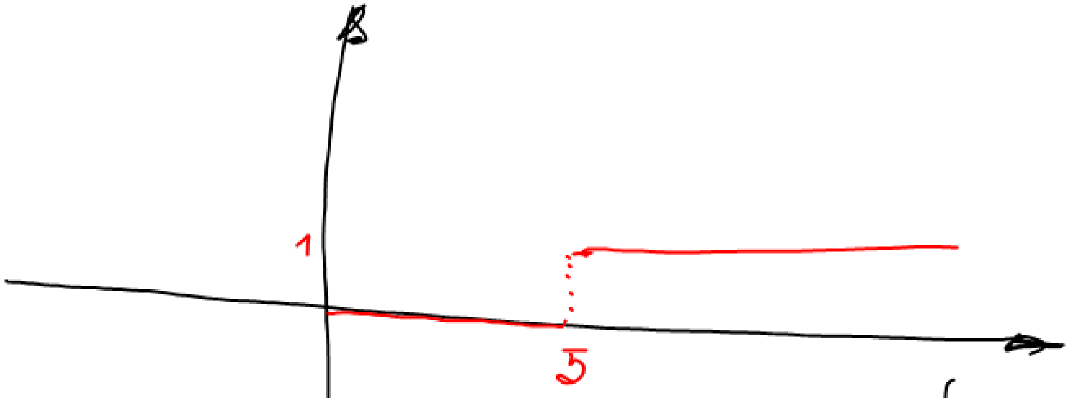
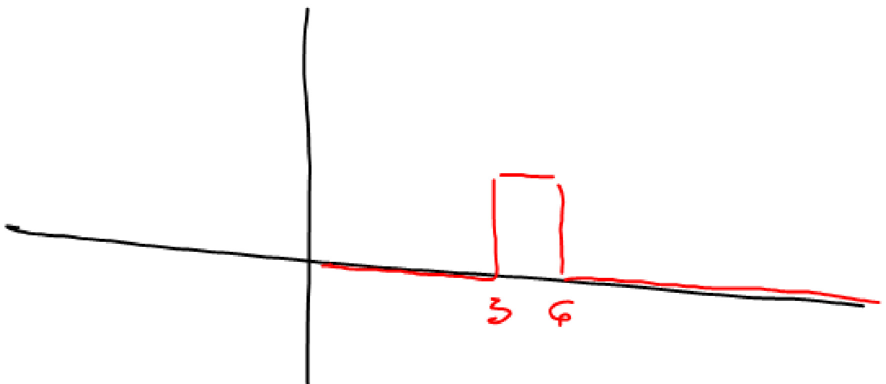
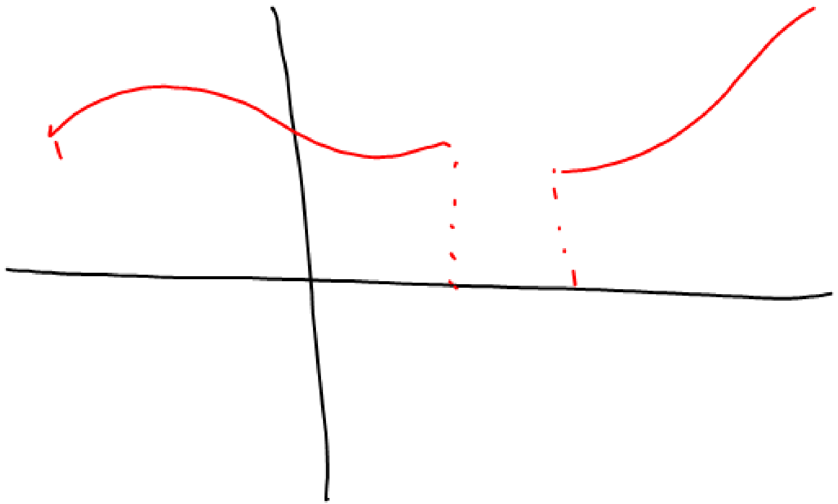


$$u(t-5) = \begin{cases} 0 \ ; & t < 5 \\ 1 \ ; & t \geq 5 \end{cases}$$



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



Teorema de Existencia y Unicidad de la transformada de Laplace

Dada una $f(t)$ existirá transf. Lapl. cuando cumpla los sig. requisitos

a) sea de orden exponencial

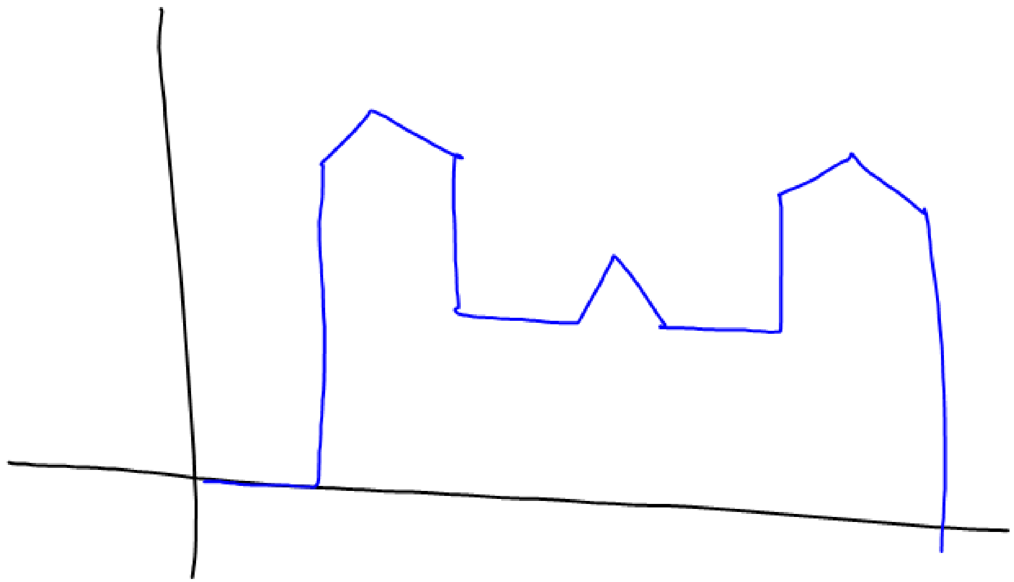
b) sea seccionalmente continua

Sea de orden exponencial:

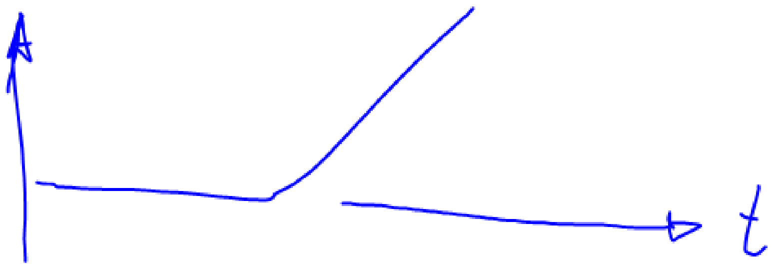
$$|f(t)| \leq M e^{at} \qquad M, a \in \mathbb{R}$$

$$e^{5t} \qquad \cancel{e^{5t^2} \cdots\cdots e^{5t^n}} \quad n > 1$$

$$L\frac{dI}{dt} + RI = 117\cos(60t)\,u(t-a)$$



$u(t-a)$

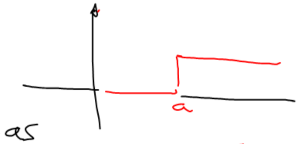


$$r(t-a) = \begin{cases} 0; & t < a \\ (t-a)\,u(t-a) & t \geq a \end{cases}$$

$$\delta(t-a) = \begin{cases} 0; & t \neq a \\ \int_{-\infty}^{\infty} \delta(t-a) = 1 & \end{cases}$$

$$\mathcal{L}\{f'(t)\} = s\mathcal{L}\{f(t)\} - f(0)$$

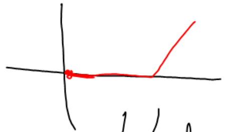
$$\mathcal{L}\{u(t-a)\} = \frac{e^{-as}}{s}$$



$$\mathcal{L}\{(t-a)u(t-a)\} = \frac{e^{-as}}{s^2}$$

$$\mathcal{L}\left\{\frac{d}{dt}\left((t-a)u(t-a)\right)\right\} = s\mathcal{L}\{(t-a)u(t-a)\} - (0)$$

$$= s\left(\frac{e^{-as}}{s^2}\right)$$



$$= \left(\frac{e^{-as}}{s}\right)$$

$$\mathcal{L}\left\{\frac{d}{dt}(t-a)(u(t-a))\right\} = \mathcal{L}\{u(t-a)\}$$

$$\frac{d}{dt}\left((t-a)(u(t-a)\right) = u(t-a)$$

$$\mathcal{L}\{\delta(t-a)\} = e^{-as}$$

$$\mathcal{L}\left\{\frac{d}{dt}u(t-a)\right\} = s\mathcal{L}\{u(t-a)\} - (0)$$

$$\mathcal{L}\left\{\frac{d}{dt}u(t-a)\right\} = s\left(\frac{e^{-as}}{s}\right)$$

$$\mathcal{L}\left\{\frac{d}{dt}u(t-a)\right\} = e^{-as}$$

$$\mathcal{L}\left\{\frac{d}{dt}u(t-a)\right\} = \mathcal{L}\{\delta(t-a)\}$$

$$\frac{d}{dt}u(t-a) = \delta(t-a)$$