Examen 23 mayo en J205

Los lunes 14 y 21 clase en J106

Serie 4 tema IV: viernes 11 mayo
para entregar el viernes 18 mayo

Serie 5 tema V: Viernes 18 mayo
para entregar el viernes 25 mayo

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

convolution

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

Example

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

$$\mathcal{L}^{-1}\left\{\frac{s}{s^2+4^2}\right\} = \cos(4t)$$

$$\mathcal{L}^{-1}\left\{\frac{4}{s^2+4^2}\right\} = \sin(4t)$$

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

$$= \frac{1}{4}\left(\cos(4t) * \sin(4t)\right)$$

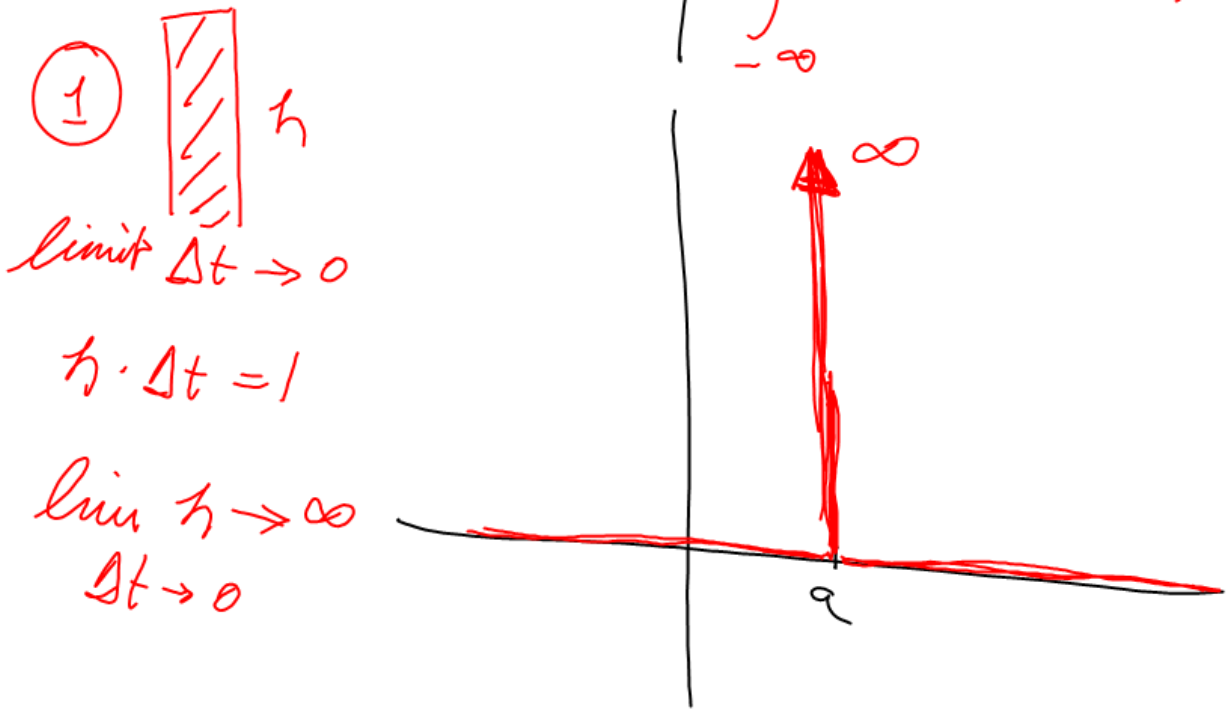
$$\cos(4t) * \sin(4t) = \int_0^t \cos(4(t-z)) \cdot \sin(4z)\, dz$$

$$= \frac{1}{2} t \sin(4t)$$

$$\mathcal{L}^{-1}\left\{ \frac{s}{(s^2+4^2)^2} \right\} = \frac{1}{8} t \operatorname{sen}(4t)$$

Dirac delta

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



límite $\Delta t \to 0$

$h \cdot \Delta t = 1$

$\lim_{\substack{h \to \infty \\ \Delta t \to 0}}$

$$\mathcal{L}\{u(t-5)\} = \frac{e^{-5s}}{s}$$

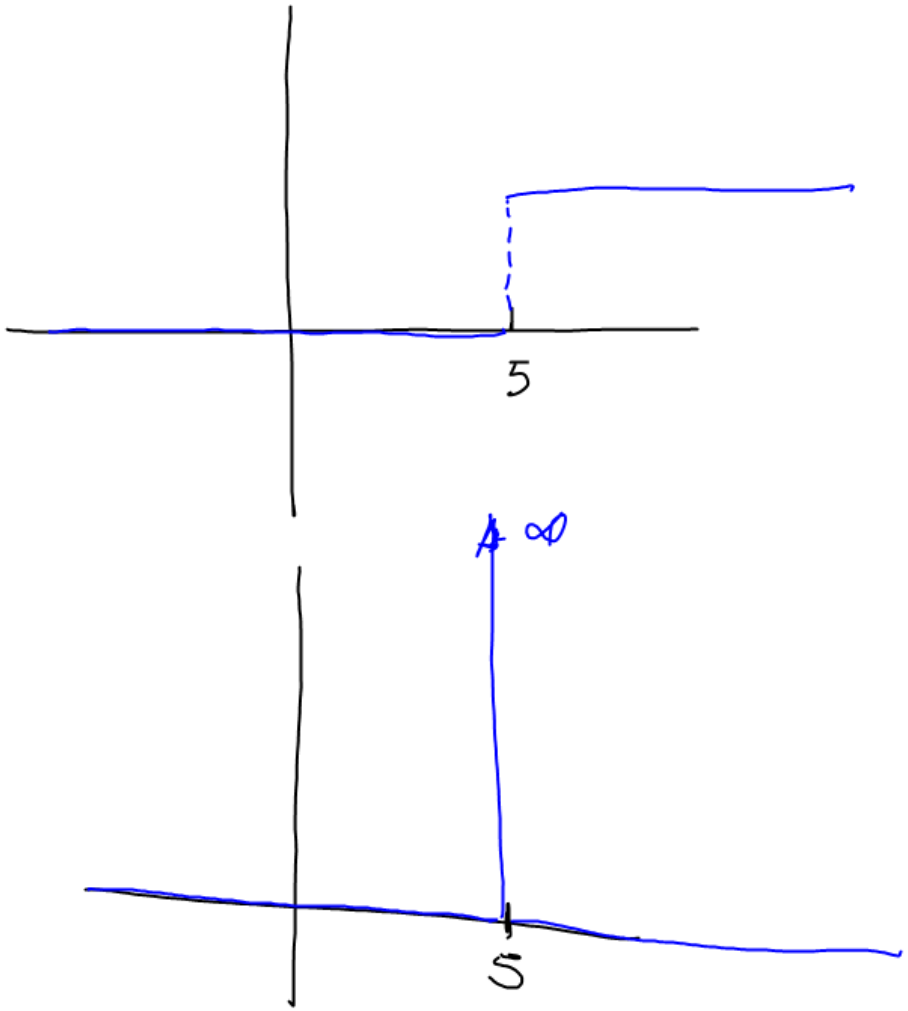
$$\mathcal{L}\left\{\frac{d}{dt}u(t-5)\right\} = s\mathcal{L}\{u(t-5)\} - u(t-5)\Big|_{t=0}$$

$$= s\left(\frac{e^{-5s}}{s}\right) - (0)$$

$$\mathcal{L}\left\{\frac{d}{dt}u(t-5)\right\} = e^{-5s}$$

$$\mathcal{L}\left\{\frac{d}{dt}u(t-5)\right\} = \mathcal{L}\{\delta(t-5)\}$$

$$\frac{d}{dt}u(t-5) = \delta(t-5)$$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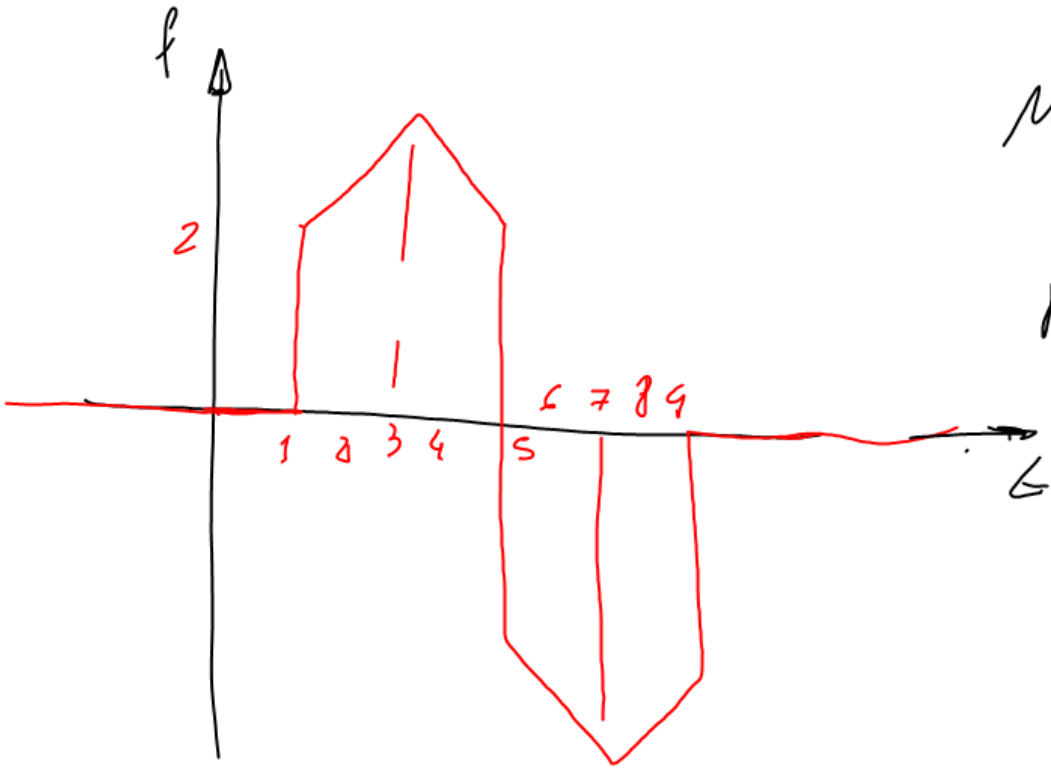
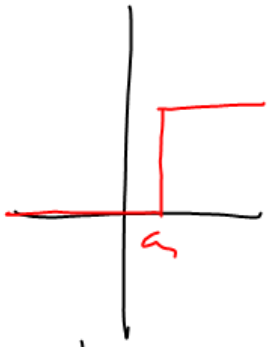
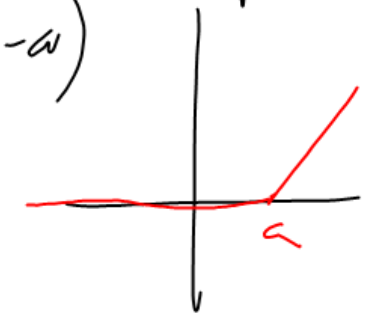


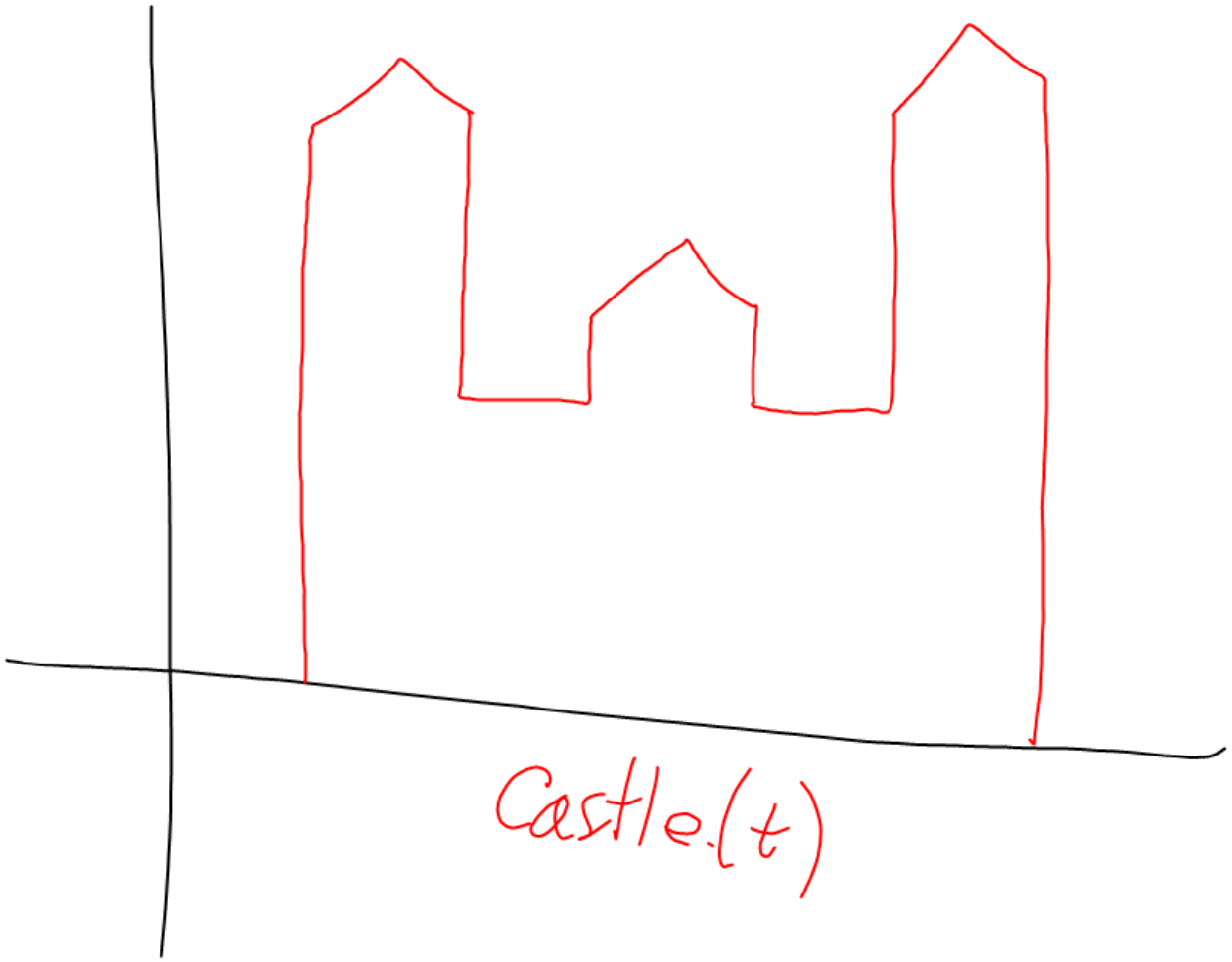
$u(t-a)$



$r(t-a)$



$f(t) =$


castle(t)

LODE(n) with Initial Conditions

$$\frac{d^2y}{dt^2} + 3\frac{dy}{dt} + 3y = 4e^{3t} + 4t^2 \qquad y(0) = 2 \qquad y'(0) = -2$$