$$F(s) = \frac{e^{-4s}}{(s+3)^5} \qquad G(s) = \frac{1}{s^2-4s+8}$$

$$\mathcal{L}^{-1}\{F(s)\} = \qquad \mathcal{L}^{-1}\{G(s)\} =$$

$$\mathcal{L}^{-1}\left\{\frac{1}{s^5}\right\} = \frac{1}{4!}\mathcal{L}^{-1}\left\{\frac{4!}{s^5}\right\} \Rightarrow \frac{1}{4!}t^4$$

$$\mathcal{L}^{-1}\left\{\frac{1}{(s+3)^5}\right\} = \frac{1}{4!}\mathcal{L}\left\{\frac{4!}{(s+3)^5}\right\} \Rightarrow \frac{1}{4!}e^{-3t}t^4$$

$$\boxed{\mathcal{L}^{-1}\left\{\frac{e^{-4s}}{(s+3)^5}\right\} = \frac{1}{4!}(t-4)^4 e^{-3(t-4)} \cdot u(t-4)}$$

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

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

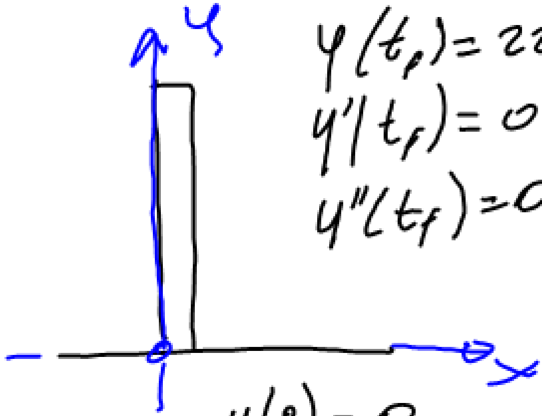
$$= \frac{1}{2}\mathcal{L}^{-1}\left\{\frac{2}{(s-2)^2+(2)^2}\right\}$$

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

$$\mathcal{L}^{-1}\left\{\frac{b}{(s-a)^2+b^2}\right\} = e^{at}\operatorname{sen}(bt)$$

$$\boxed{= \frac{1}{2}e^{2t}\operatorname{sen}(2t).}$$

- $\mathcal{L}\{e^{at}f(t)\} = F(s-a)$
- $\mathcal{L}^{-1}\{e^{-as}F(s)\} = f(t-a)\cdot u(t-a)$
- $\mathcal{L}^{-1}\left\{\frac{n!}{s^{n+1}}\right\} = t^n$
- $\mathcal{L}^{-1}\left\{\frac{s}{s^2+b^2}\right\} = \cos(bt)$
- $\mathcal{L}^{-1}\left\{\frac{b}{s^2+b^2}\right\} = \operatorname{sen}(bt)$



$y(t_f) = 225\ m$
$y'(t_f) = 0$
$y''(t_f) = 0$

$y(0) = 0$
$y'(0) = 0$
$y''(0) = 0$

$y(t)$ posición respecto al suelo

$v(t) = \frac{dy(t)}{dt}$ velocidad

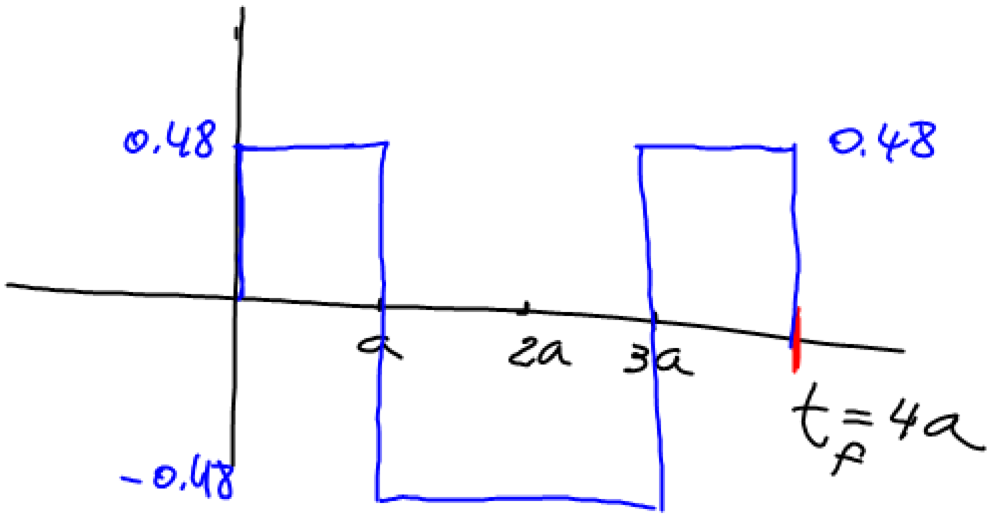
$a(t) = \frac{dv(t)}{dt}$ aceleración

$s(t) = \frac{da(t)}{dt}$ sacudida $= \frac{d^3y(t)}{dt^3}$

$s(t) \leq 1.6 \frac{ft}{s^3} = 0.48 \frac{m}{s^3}$ $\quad t_f$?

$s(t) =$

$$y(t_f) = 225\ [m]$$



$$\frac{d^3 y(t)}{dt^3} = s(t)$$