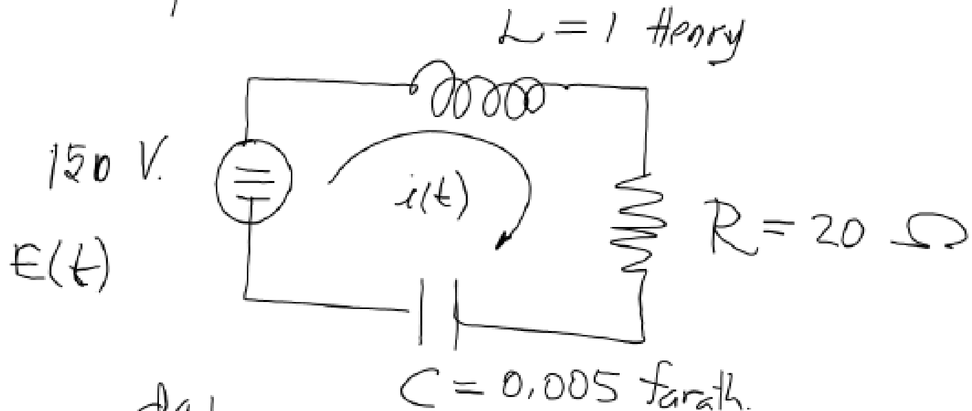
Aplicaciones de T. L.



$$\left.\frac{dq}{dt}\right|_{t=0} = i(0) = 0 \qquad q(0) = 0$$

$$L\frac{di}{dt} + Ri + \frac{q}{C} = E(t) \qquad i = \frac{dq}{dt}$$

$$L\frac{d^2q}{dt^2} + R\frac{dq}{dt} + \frac{q}{C} = 150$$

$$\frac{d^2q}{dt^2} + 20\frac{dq}{dt} + \frac{q}{0{,}005} = 150$$

$$\mathcal{L}\left\{\frac{d^2q}{dt^2} + 20\frac{dq}{dt} + 200q\right\} = 150\,\mathcal{L}\{1\}$$

$$\left[s^2Q(s) - s\cdot(0) - (0)\right] + 20\left[sQ(s) - (0)\right] + 200\,Q(s) = \frac{150}{s}$$

$$\left(s^2 + 20s + 200\right)Q(s) = \frac{150}{s}$$

$$Q(s) = \frac{150}{s\left(s^2 + 20s + 200\right)}$$

$$Q(s) = \frac{A}{s} + \frac{Bs + D}{s^2 + 20s + 200}$$

$$150 = A(s^2+20s+200)+(Bs+D)s$$
$$= As^2+20As+200A + Bs^2+Ds$$
$$= (A+B)s^2+(20A+D)s+200A$$

$$\left[\begin{array}{l} A+B=0 \\ 20A+D=0 \\ 200A=150 \end{array}\right]$$

$$A = \frac{150}{200} \Rightarrow \frac{3}{4}$$

$$D = -20A \qquad D = -20\left(\frac{3}{4}\right) \Rightarrow -15$$

$$B = -A \qquad B = -\frac{3}{4}$$

$$Q(s) = \frac{\frac{3}{4}}{s} + \frac{-\frac{3}{4}s - 15}{s^2+20s+200}$$

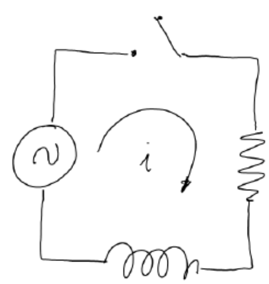
$$= \frac{3}{4}\cdot\frac{1}{s} - \frac{3}{4}\left(\frac{s+20}{(s^2+20s+100)+100}\right)$$

$$= \frac{3}{4}\cdot\frac{1}{s} - \frac{3}{4}\left(\frac{s+10+10}{(s+10)^2+10^2}\right)$$

$$= \frac{3}{4}\cdot\frac{1}{s} - \frac{3}{4}\left(\frac{s+10}{(s+10)^2+10^2}\right) - \frac{3}{4}\left(\frac{10}{(s+10)^2+10^2}\right)$$

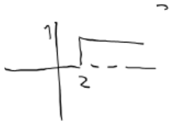
$$q(t) = \frac{3}{4}\mathcal{L}^{-1}\left\{\frac{1}{s}\right\} - \frac{3}{4}\mathcal{L}^{-1}\left\{\frac{s+10}{}\right\} - \frac{3}{4}\left\{\frac{10}{}\right\}$$

$$q(t) = \frac{3}{4}(1) - \frac{3}{4}e^{-10t}\cos(10t) - \frac{3}{4}e^{-10t}\operatorname{sen}(10t)$$



$R = 60\ \Omega$

$L = 3\,H.$



$$L\frac{di}{dt} + Ri = 120\operatorname{sen}(60(2\pi(t-2)))u(t-2)$$

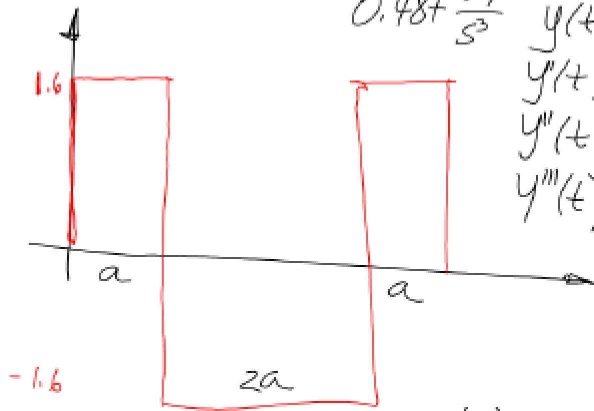
$$i(0) = 0$$

$$3\frac{di}{dt} + 60i = 120\operatorname{sen}(120\pi(t-2))u(t-2)$$

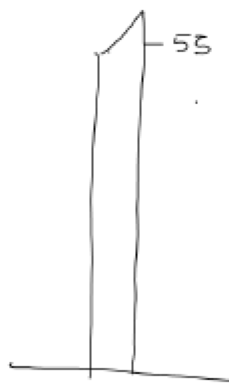
$$\frac{di}{dt} + 20i = 40\operatorname{sen}(120\pi(t-2))u(t-2)$$

la sacudida $\leq 1.6\ ft/s^2/s$

$0.487\ \frac{m}{s^3}$



$y(t)$ recorrido
$y'(t)$ veloc.
$y''(t)$ acelera
$y'''(t)$ sacudida



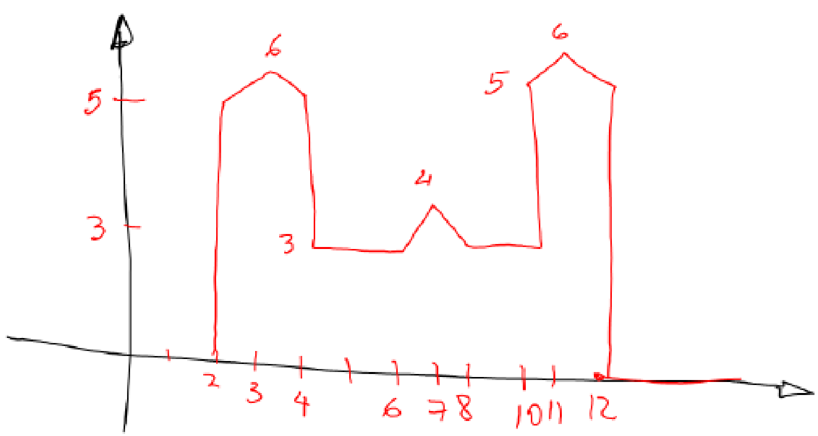
$y(t_v) = 225\ m.$
$y'(t_v) = 0$
$y''(t_v) = 0$
$y'''(t_v) = 0$

$y(0) = 0$
$y'(0) = 0$
$y''(0) = 0$
$y'''(t).$

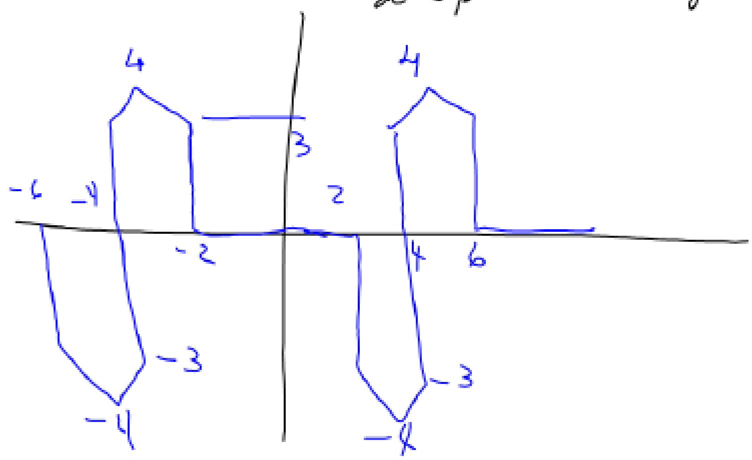
REFORMA.

$$\frac{d^3 y(t)}{dt^3} = u(t) - 2u(t-a) + 2u(t-3a) - u(t-4a)$$

$y(0) = 0 \quad y'(0) = 0 \quad y''(0) = 0$



Tarea 2.- Obtener la Transformada de Laplace de la siguiente gráfica:



para entregar miércoles 27 a 23.59 h.