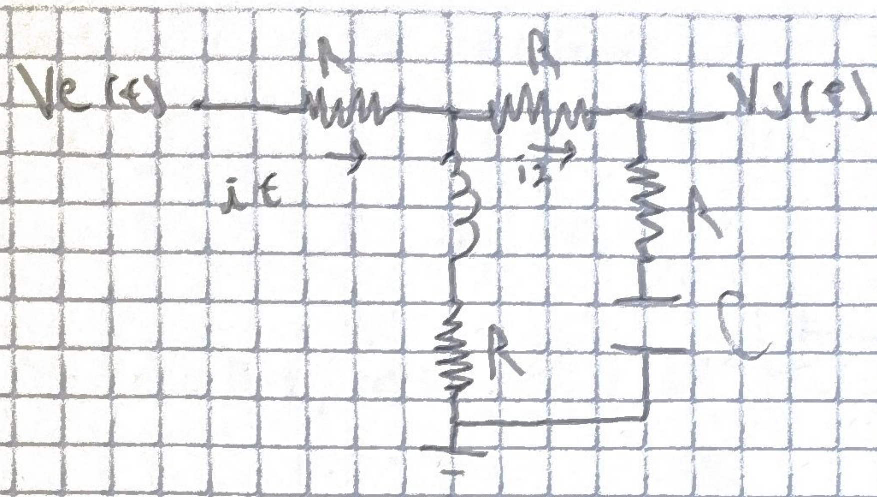

$$Ve(t) = R\,i_1(t) + L\frac{d}{dt}\left(i_1(t) - i_2(t)\right) + R\left(i_1(t) - i_2(t)\right)$$

$$L\frac{d\left(i_1(t) - i_2(t)\right)}{dt} + R\left(i_1(t) - i_2(t)\right) = R\,i_2(t) + R\,i_2(t) + \frac{1}{C}\int i_2(t)\,dt$$

$$Vs(t) = R\,i_2(t) + \frac{1}{C}\int i_2(t)\,dt$$

Modelo de E I-D

$$i_1(t) = \left(Ve(t) - \frac{L\,d\left(i_1(t) - i_2(t)\right)}{dt} + R\,i_2(t)\right)\frac{1}{2R}$$

$$i_2(t) = \left(\frac{L\,d\left(i_1(t) - i_2(t)\right)}{dt} + R\,i_1(t) - \frac{1}{C}\int i_2(t)\,dt\right)\frac{1}{3R}$$

$$Vs = R\,i_2(t) + \frac{1}{C}\int i_2(t)\,dt$$

Mismo circuito electrico

$\frac{Vs(s)}{Ve(s)} = \frac{?\ I_2(s)}{?\ I_2(s)}$

Nota: No debe haber terminos negativos

$$Ve(t) = R i_1(t) + \frac{L d(i_1(t) - i_2(t))}{dt} + R(i_1(t)\ i_2(t))$$

$$\frac{L d(i_1(t) - i_2(t))}{dt} + R(i_1(t) - i_2(t)) = R i_2(t) + R i_2(t) + \frac{1}{C}\int i_2(t)dt$$

$$\frac{1}{s}(t) = \frac{1}{C}\int i_2(t)dt + R i_2(t)$$

Transformada de Laplace

$$L s I_1(s) - L s I_2(s) + R I_1(s) - R I_2(s)$$

$$Ve(s) = R I_1(s) + L s\left[I_1(s) - I_2(s)\right] + R\left[I_1(s) - I_2(s)\right]$$

$$L s\left[I_1(s) - I_2(s)\right] + R\left[I_1(s) - I_2(s)\right] = R I_2(s) + R I_2(s) + \frac{I_2(s)}{Cs}$$

$$Vs(s) = R I_2 + \frac{I_2(s)}{Cs} = \frac{CRs + 1}{Cs} I_2(s)$$

Procedimiento algebraico

$$Ve(s) = (R + Ls + R) I_1(s) - (Ls + R) I_2(s)$$

$$= (Ls + 2R) I_1(s) - (Ls + R) I_2(s)$$

$$Ls I_1(s) - Ls I_2(s) + R I_1(s) + R I_2(s) = 2 R I_2(s) + \frac{I_2(s)}{Cs}$$

$$Ls I_1(s) + R I_1(s) = 3R I_2(s) + Ls I_2(s) + \frac{I_2(s)}{Cs}$$

$$(Ls+R)I_1(s) = \left(3R + Ls + \frac{1}{Cs}\right) I_2(s)$$

$$V_e(s) = \frac{(Ls+2R)(CLs^2+3CRs+1)\,I_1(s)}{Cs(Ls+R)} - (Ls+R)\,I_2(s)$$

$$\left[\frac{(Ls+2R)(CLs^2+3CRs+1) - Cs(Ls+R)(Ls+R)}{Cs(Ls+R)}\right] I_2(s)$$

$$CLs^3 + 3CLRs + Ls + \cancel{2CLRs} + 6CR^2s + 2R$$
$$-\cancel{CL^2s^3} - 2CLRs^2 - CR^2s$$

$$V_e(s) = \frac{3CLRs^2 + (5CRs + L)s + 2R}{Cs(Ls+R)}$$

$$\frac{V_s(s)}{V_e(s)} = \frac{CLRs^2 + (CR^2+L)s + R}{3CLRs^2 + (5CR^2+L)s + 2R}$$

4.7E-6 $\qquad$ 47 E-5