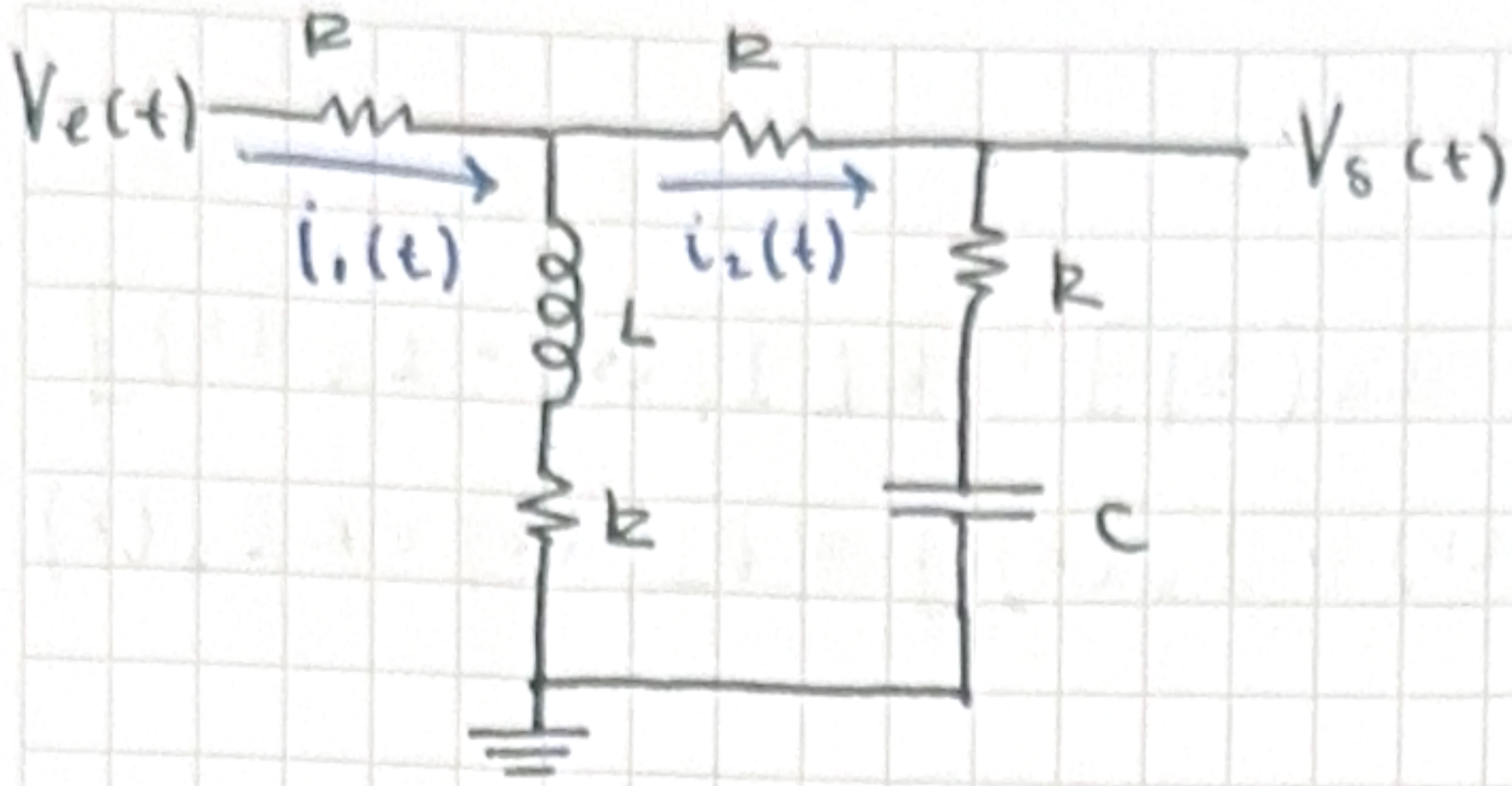


Ecuaciones principales

- $V_e(t) = Ri_1(t) + \dfrac{L\,d[i_1(t) - i_2(t)]}{dt} + R[i_1(t) - i_2(t)]$

- $\dfrac{L\,d[i_1(t) - i_2(t)]}{dt} + R[i_1(t) - i_2(t)] = Ri_2(t) + Ri_2(t) + \dfrac{1}{C}\int i_2(t)dt$

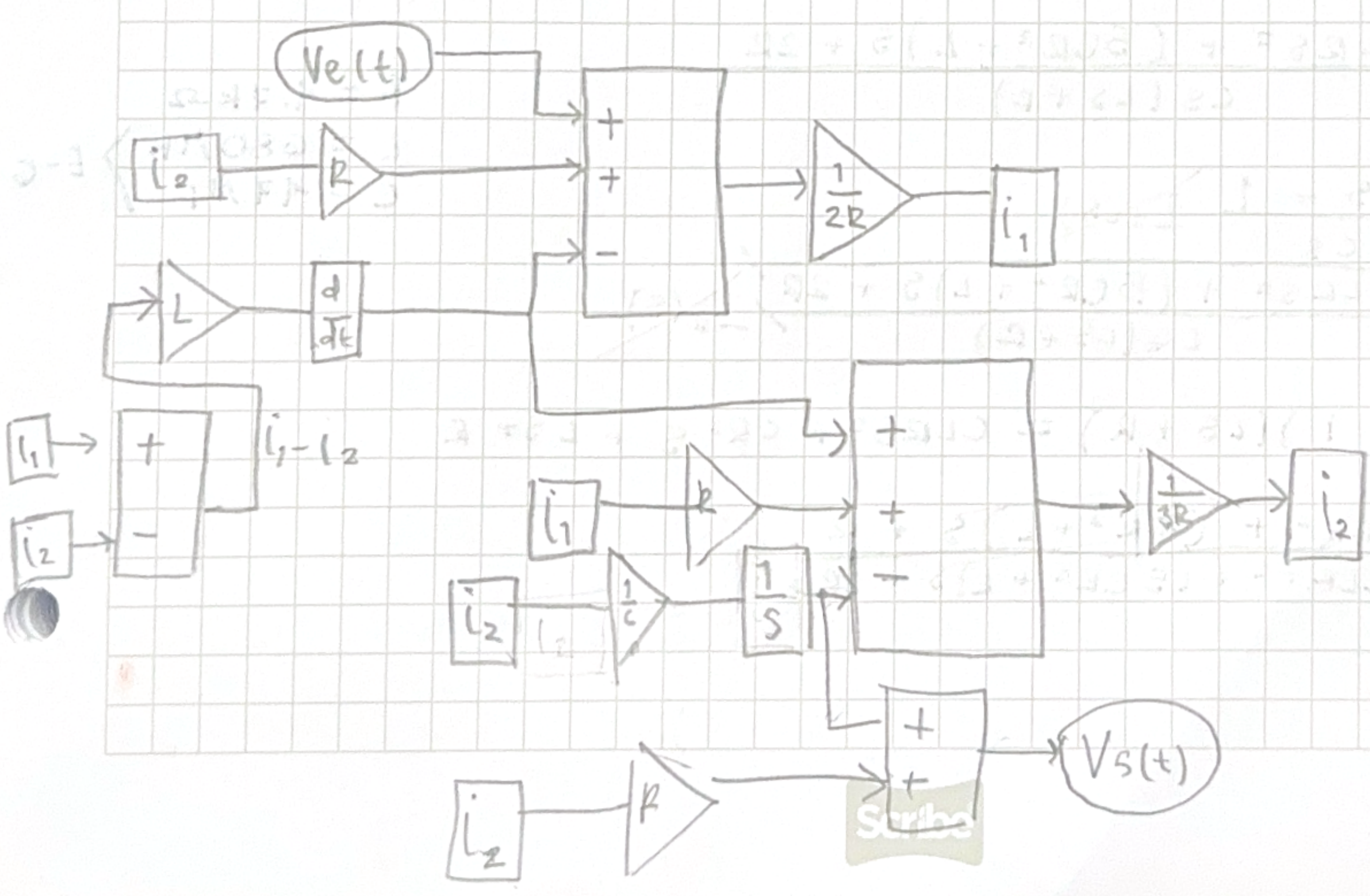
- $V_s(t) = Ri_2(t) + \dfrac{1}{C}\int i_2(t)dt$

Modelo de
Ecuaciones integro-diferenciales

- $i_1(t) = \left[V_e(t) - \dfrac{L\,d[i_1(t) - i_2(t)]}{dt} + Ri_2(t)\right]\dfrac{1}{2R}$

- $i_2(t) = \left[\dfrac{L\,d[i_1(t) - i_2(t)]}{dt} + Ri_1(t) - \dfrac{1}{C}\int i_2(t)dt\right]\dfrac{1}{3R}$

- $V_s(t) = Ri_2(t) + \dfrac{1}{C}\int i_2(t)dt$



- Transformada de laplace

$$V_e(s) = RI_1(s) + LS[I_1(s) - I_2(s)] + R[I_1(s) - I_2(s)]$$

$$LS[I_1(s) - I_2(s)] + R[I_1(s) - I_2(s)] = RI_2(s) + RI_2(s) + \frac{I_2(s)}{CS}$$

$$V_s(s) = RI_2(s) + \frac{I_2(s)}{CS}$$

- Procedimiento algebraico

$$V_e(s) = (R + LS + R)\, I_1(s) - (LS + R)\, I_2(s)$$

$$= (LS + 2R)\, I_1(s) - (LS + R)\, I_2(s)$$

$$LS\, I_1(s) - LS\, I_2(s) + R I_1(s) - R I_2(s) = 2R I_2(s) + \frac{I_2(s)}{CS}$$

$$LS\, I_1(s) + R I_1(s) = 3R I_2(s) + LS\, I_2(s) + \frac{I_2(s)}{CS}$$

$$(LSI_1(s) + RI_1(s)) = \left(3R + LS + \frac{1}{CS}\right) I_2(s)$$

$$I_1(s) = \frac{3CRS + CLS^2 + 1}{CS(LS+R)} I_2(s) = \frac{CLS + 3CRS + 1}{CS(LS+R)} I_2(s)$$

$$V_e(s) = \frac{(LS + 2R)(CLS^2 + 3CRS + 1)}{CS(LS+R)} I_2(s) - (LS+R)\, I_2(s)$$

$$= \left[\frac{(LS + 2R)(CLS^2 + 3CRS + 1) - CS(LS+R)(LS+R)}{CS(LS+R)}\right] I_2(s)$$

$5CR^2S$

$$\cancel{CL^2S^3} + 3CLRS^2 + LS + \cancel{2CLRS^2} + 6CR^2S + 2R - \cancel{CL^2S^3} - \cancel{2CLRS^2} - CR^2S$$

$$V_e(s) = \frac{3CLRS^2 + (5CR^2 + L)S + 2R}{CS(LS+R)}$$

$R = 4.7k\Omega$
$L = 680\,MH$
$C = 47\,MF$ } E-6

$$V_s(s) = \frac{\frac{CRS + 1}{CS}\cancel{I_2(s)}}{\frac{3CLRS^2 + (5CR^2 + L)S + 2R}{CS(LS+R)}\cancel{I_2(s)}}$$

$$(CRS + 1)(LS + R) = CLRS^2 + CR^2S + LS + R$$

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

num =

- Estabilidad en lazo abierto

  - Calcular los polos de la función de transferencia

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

den=[3*C*L*R, 5*C*R**2 + L, 2*R]

L = n?

- Error en estado estacionario

$$V_e(t) = 1$$
$$V_e(s) = \frac{1}{s}$$

$$e(s) = \lim_{s\to 0} sV_e(s)\left[1 - \frac{V_s(s)}{V_e(s)}\right]$$

$$= \lim_{s\to 0} s * \frac{1}{s}\left[1 - \frac{CLRs^2 + (CR^2+L)s + R}{3CLRs^2 + (5CR^2+L)s + 2R}\right]$$

$$= \frac{R}{2R}$$

$$e(t) = \frac{1}{2}$$

El sistema presenta una respuesta estable y sobreamortiguada