

$$R_{in} = 50 \Omega \quad R_1 = 100 \Omega$$

$$R_2 = 80 \Omega \quad C = 0.05 \mu F$$

$$L = 0.01 H \quad V_s = 10u(t+\infty) - 10u(t) V$$

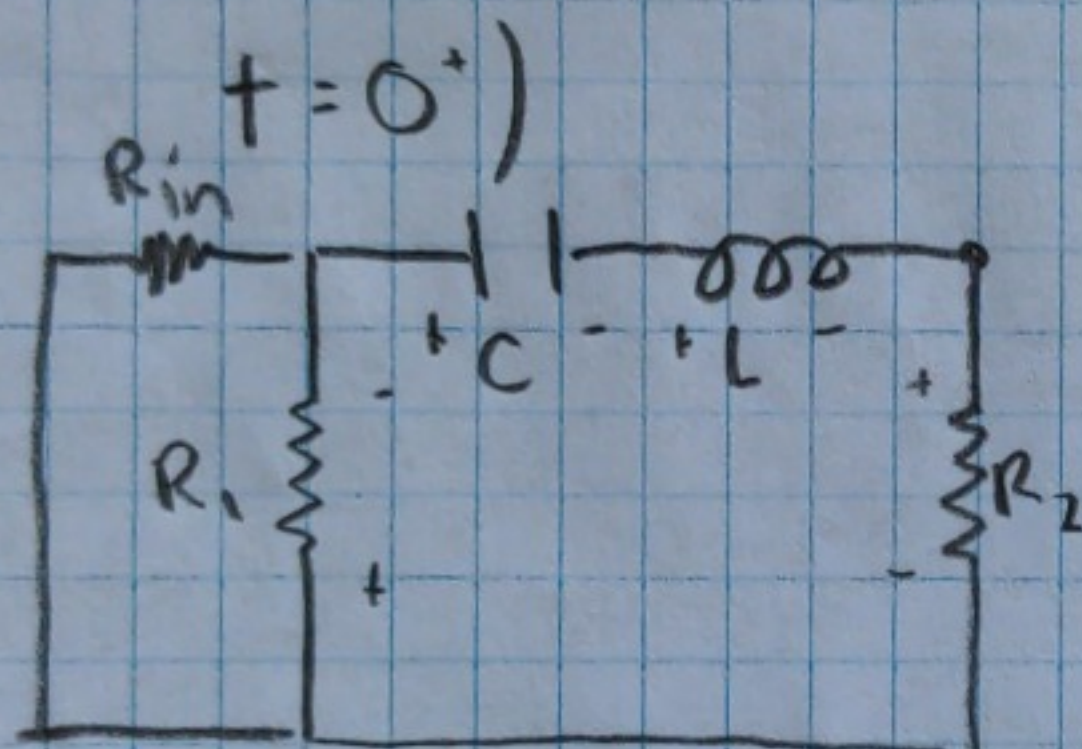
t	i_L	V_C	$\frac{di_L}{dt}$	$\frac{dV_C}{dt}$
0^-	0 A	6.67 V		
0^+	0 A	6.67 V	-667 A/s	0 V/s
∞	0 A	0 V		

$$t = 0^-) \quad V_C = V_a = V_s \left(\frac{R_1}{R_{in} + R_1} \right)$$

$$V_C = 10 V \left(\frac{100 \Omega}{150 \Omega} \right)$$

$$V_C = 6.67 V$$

$$i_L = 0 A$$



$$R_{Th} = R_{in} \parallel R_1 + R_2 = 113.33 \Omega$$

$$\text{KVL)} \quad +V_{R_{Th}} + 6.67 V + V_L = 0$$

$$0 + 6.67 V + V_L = 0$$

$$V_L = -6.67 V$$

$$\frac{di_L}{dt} = \frac{V_L}{L} = \frac{-6.67 V}{0.01 H} = -667 A/s$$

$$R_{Th} = 113.33 \Omega \quad C = 0.05 \mu F \quad L = 0.01 H$$

$$\alpha = \frac{R_{Th}}{2L} = 5667 \text{ NP/s} \quad \omega_0 = \frac{1}{\sqrt{LC}} = 44721.36 \text{ rad/s} \quad \alpha < \omega_0$$

$$\omega_d = \sqrt{\omega_0^2 - \alpha^2} = 44361 \text{ rad/s}$$

$$i(0) = 0 A = B_1$$

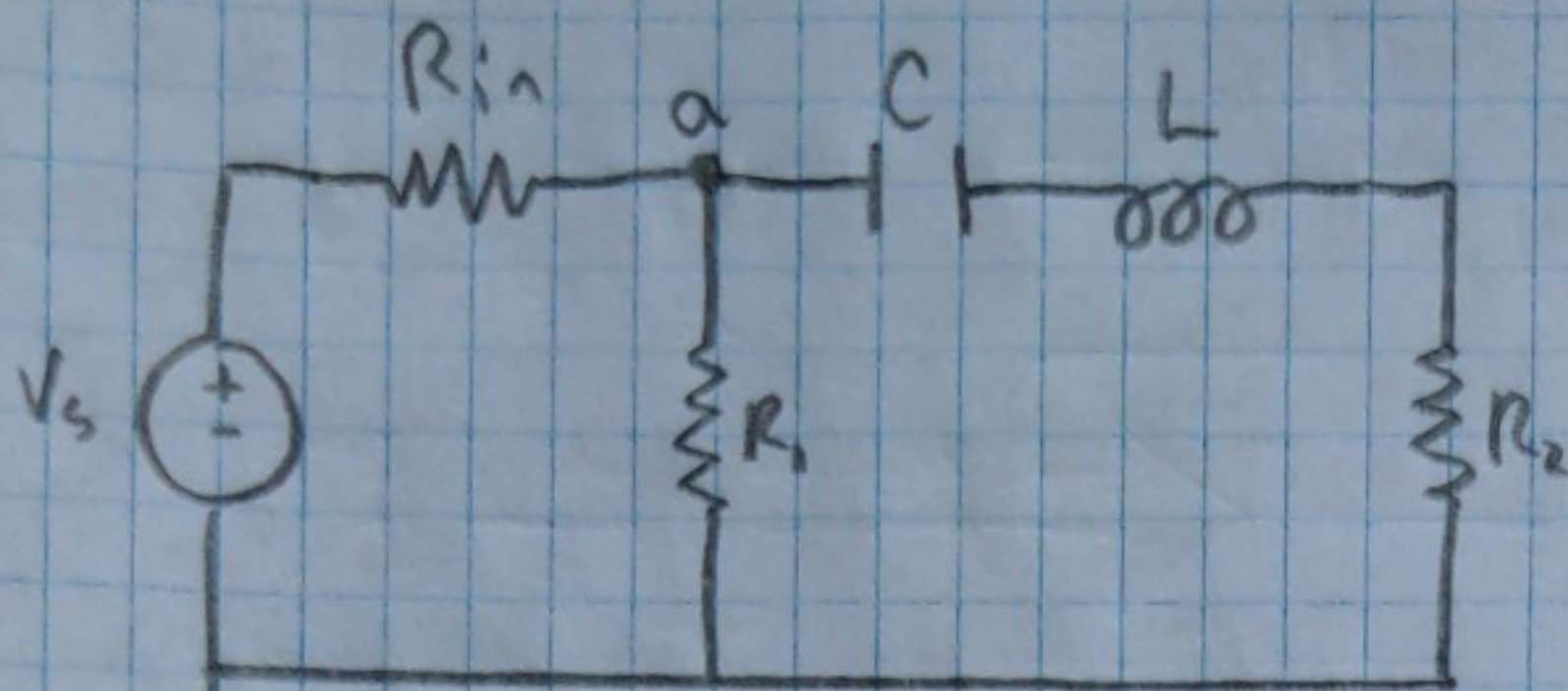
$$\frac{di(0)}{dt} = 667 A/s = 44361 B_2$$

$$B_2 = -0.015 A$$

$$i(t) = e^{-\alpha t} (B_1 \cos(\omega_d t) + B_2 \sin(\omega_d t))$$

$$\frac{di(t)}{dt} = -\alpha e^{-\alpha t} (B_1 \cos(\omega_d t) + B_2 \sin(\omega_d t)) + e^{-\alpha t} (-\omega_d B_1 \sin(\omega_d t) + \omega_d B_2 \cos(\omega_d t))$$

$$i(t) = -0.015 e^{-5667 t} \sin(44361 t) A$$



$$R_{in} = 50 \Omega \quad R_1 = 5000 \Omega$$

$$R_2 = 1500 \Omega \quad C = 0.05 \text{ mF}$$

$$L = 0.01 \text{ H} \quad V_s = 10u(t+\infty) - 10u(t) \text{ V}$$

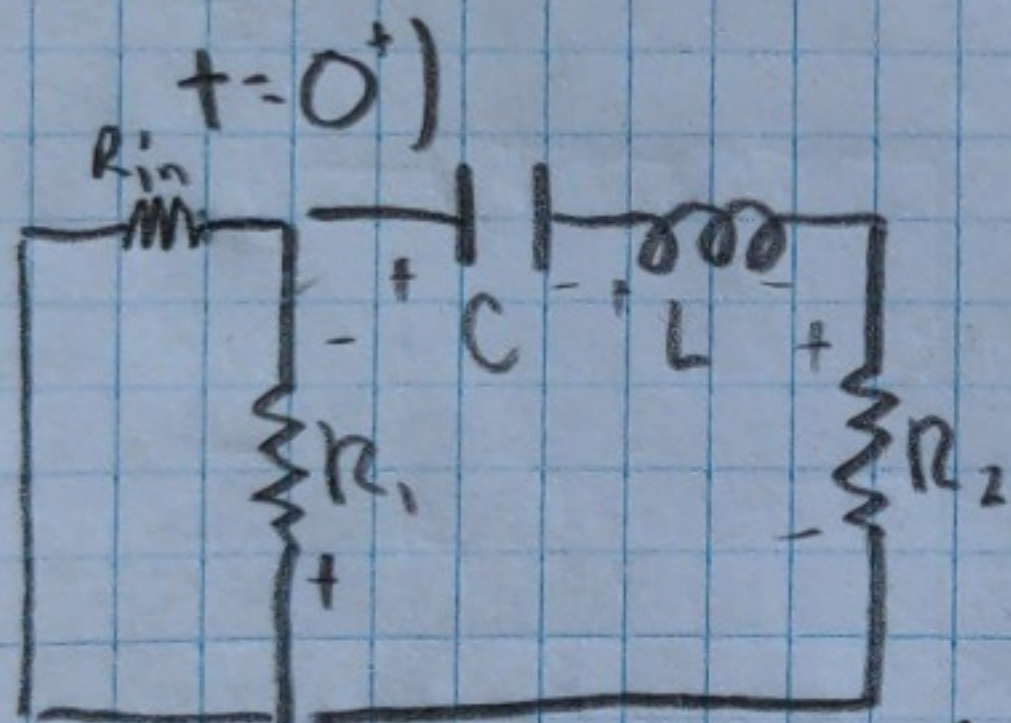
t	i_L	V_C	$\frac{di_L}{dt}$	$\frac{dV_C}{dt}$
0^-	0 A	9.9 V	 	
0^+	0 A	9.9 V	-990 A/s	0 V/s
∞	0 A	0 V	 	

$$t = 0^-) \quad V_C = V_a = V_s \left(\frac{R_1}{R_1 + R_{in}} \right)$$

$$V_C = 10 \text{ V} \left(\frac{5000 \Omega}{5050 \Omega} \right)$$

$$V_C = 9.9 \text{ V}$$

$$i_L = 0 \text{ A}$$



$$R_{Th} = R_{in} \parallel R_1 + R_2 = 1549.5 \Omega$$

$$\text{KVL)} \quad +V_{R_{Th}} + V_C + V_L = 0$$

$$0 + 9.9 \text{ V} + V_L = 0$$

$$V_L = -9.9 \text{ V}$$

$$\frac{di_L}{dt} = \frac{V_L}{L} = \frac{-9.9 \text{ V}}{0.01 \text{ H}} = -990 \text{ A/s}$$

$$R_{Th} = 1549.5 \Omega \quad C = 0.05 \text{ mF} \quad L = 0.01 \text{ H}$$

$$\alpha = \frac{R}{2L} = 7747.5 \text{ NP/s}$$

$$\omega_0 = 44721.36 \text{ rad/s} \quad \alpha > \omega_0$$

$$s_1 = -14211$$

$$s_2 = -140740$$

$$i(t) = A_1 e^{s_1 t} + A_2 e^{s_2 t}$$

$$i(0) = 0 \text{ A} = A_1 + A_2 \rightarrow A_2 = -A_1$$

$$\frac{di(t)}{dt} = s_1 A_1 + s_2 A_2$$

$$\frac{di(0)}{dt} = -990 \text{ A/s} = s_1 A_1 + s_2 A_2$$

$$-990 = 126529 A_1$$

$$A_1 = -0.0078 \text{ A}$$

$$\rightarrow i(t) = -0.0078 e^{-14211 t} + 0.0078 e^{-140740 t}$$