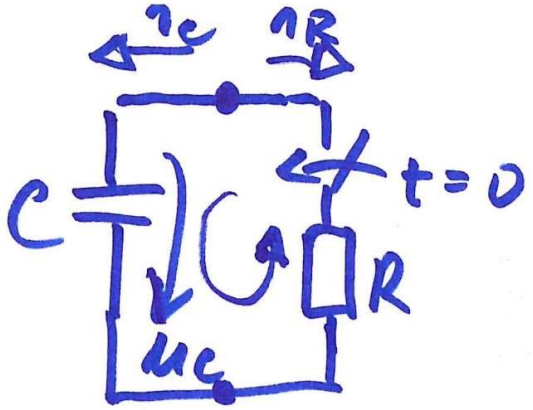
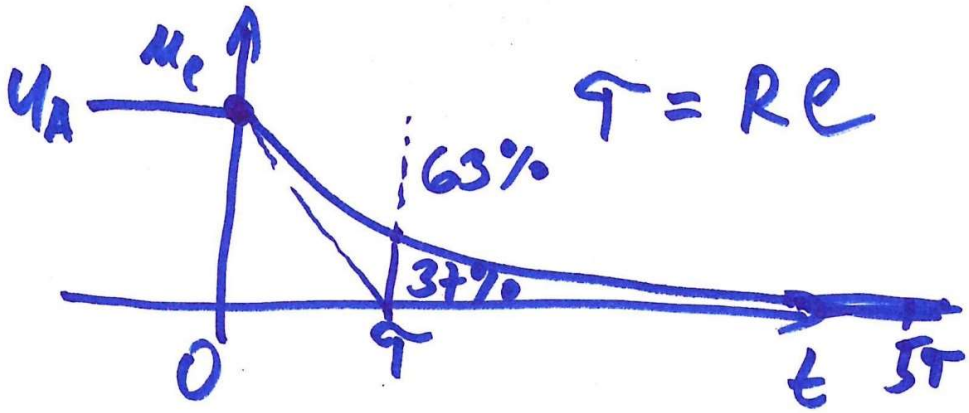


$u_c(0) = U_A$

$W_c(0) = \frac{1}{2} C U_A^2$



$\tau = RC$

① $C\frac{du_c}{dt} + \frac{u_c}{R} = 0 \qquad C\lambda + \frac{1}{R} = 0$

$\lambda = -\frac{1}{RC}$

② $\frac{1}{C}\int_0^t i\,dt + u_c(0) + Ri = 0$

$\frac{1}{C} i + R\frac{di}{dt} = 0$

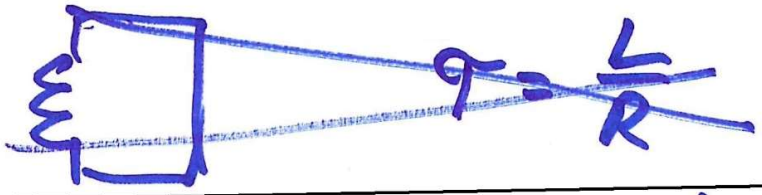
$CR\frac{di}{dt} + i = 0 \qquad i(0_+) = \frac{-U_A}{R}$

③ $u_c + Ri = 0 \qquad i = C\frac{du_c}{dt}$

$u_c + RC\frac{du_c}{dt} = 0$

$$u_c(t) = Ke^{\lambda t} = Ke^{-\frac{t}{\tau}}$$

$$\tau = \frac{1}{|\lambda|} = RC$$



$$u_c(t) = Ke^{-\frac{t}{RC}}$$

$t = 0$: $U_A = K \cdot 1$

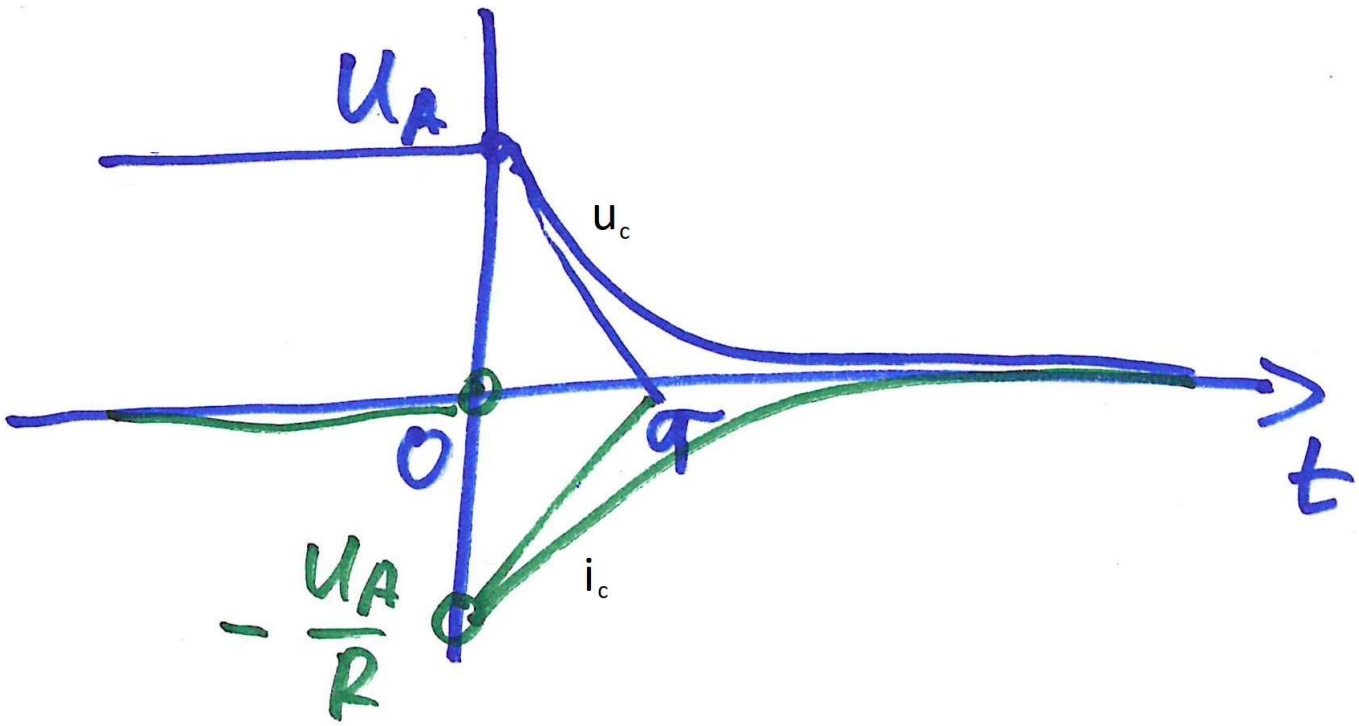
$$\underline{u_c(t) = U_A e^{-\frac{t}{RC}}}$$

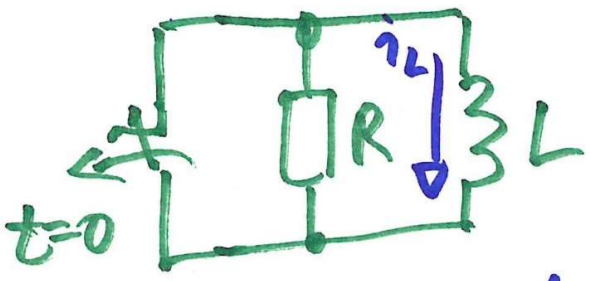
$e^0 = 1 \quad e^{-\infty} = 0 \quad e^{-\frac{t}{\tau}} = e^{-1} \doteq 0{,}37$

$e^{-5} \doteq 0{,}00;$

$$i_c = C\frac{du_c}{dt} = CU_A e^{-\frac{t}{RC}} \cdot \left(-\frac{1}{RC}\right) =$$

$$= -\frac{U_A}{R} e^{-\frac{t}{RC}}$$


U_A
u_c
0
τ
t
i_c
$-\frac{U_A}{R}$

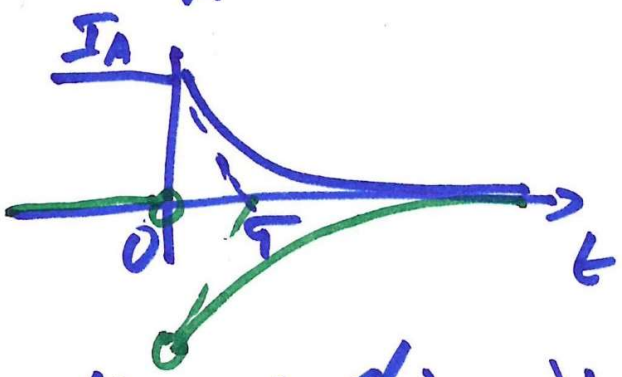


$$i_L(0) = I_A$$

$t>0$: $L\frac{di}{dt} + Ri = 0$

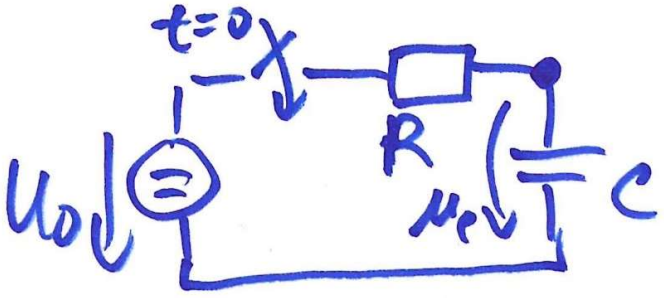
$$i(t) = Ke^{-\frac{t}{\tau}} \qquad \tau = \frac{L}{R}$$

$t=0$: $I_A = K \Rightarrow$ $\underline{\underline{i(t) = I_A e^{-\frac{t}{\tau}}}}$



$$u_L = L\frac{di}{dt} = L I_A e^{-\frac{t}{\tau}} \cdot \left(-\frac{R}{L}\right) =$$

$$= -RI_A e^{-\frac{t}{\tau}}$$



$u_c(0) = U_A$

$$C\frac{du_c}{dt} + \frac{u_c - u_0}{R} = 0$$

$$\frac{du_c}{dt} + \frac{u_c}{RC} = \frac{u_0}{RC}$$

$$u_{c0} = Ke^{-\frac{t}{RC}}$$

$$u_{cp} = u_0$$

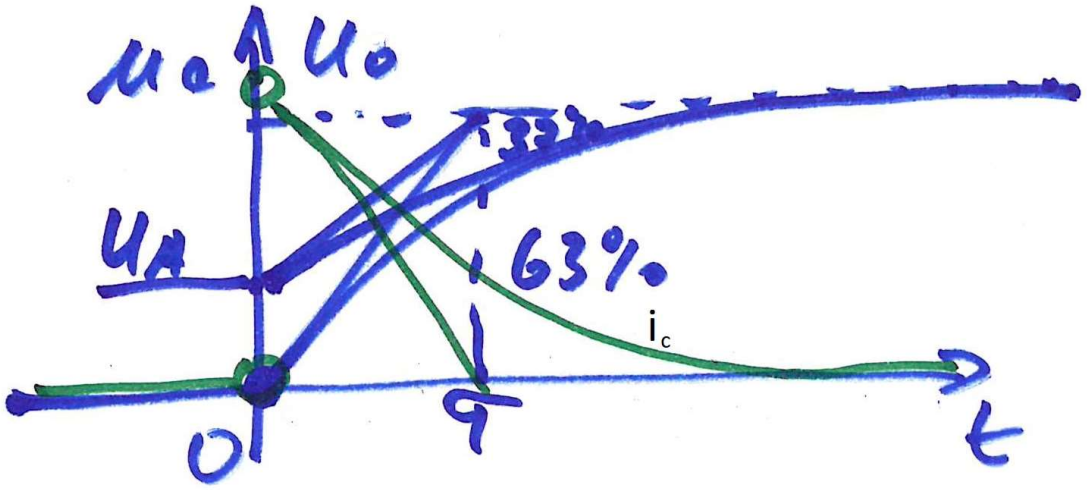
$$u_c(t) = Ke^{-\frac{t}{RC}} + u_0$$

$t=0$: $U_A = K + u_0$ $\quad K = U_A - u_0$

$$\underline{u_c(t) = (U_A - u_0)e^{-\frac{t}{RC}} + u_0}$$

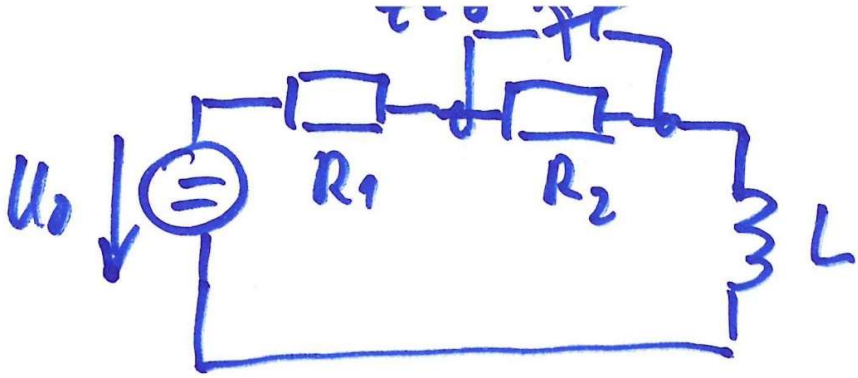
$U_A = 0$: $u_c(t) = -u_0 e^{-\frac{t}{RC}} + u_0 =$

$$\underline{= u_0\left(1 - e^{-\frac{t}{\tau}}\right)}$$



$$i_c = C\frac{du_c}{dt} = \frac{U_0}{R}\left(+e^{-\frac{t}{RC}}\cdot\frac{1}{RC}\right) =$$

$$= \frac{U_0}{R}e^{-\frac{t}{\tau}}$$



$$i_L(0) = \frac{U_0}{R_1} \qquad L\frac{di}{dt} + (R_1+R_2)i = U_0$$

$$i_0 = Ke^{-\frac{t}{\tau}} \qquad \tau = \frac{L}{R_1+R_2}$$

$$i_p = \frac{U_0}{R_1+R_2}$$

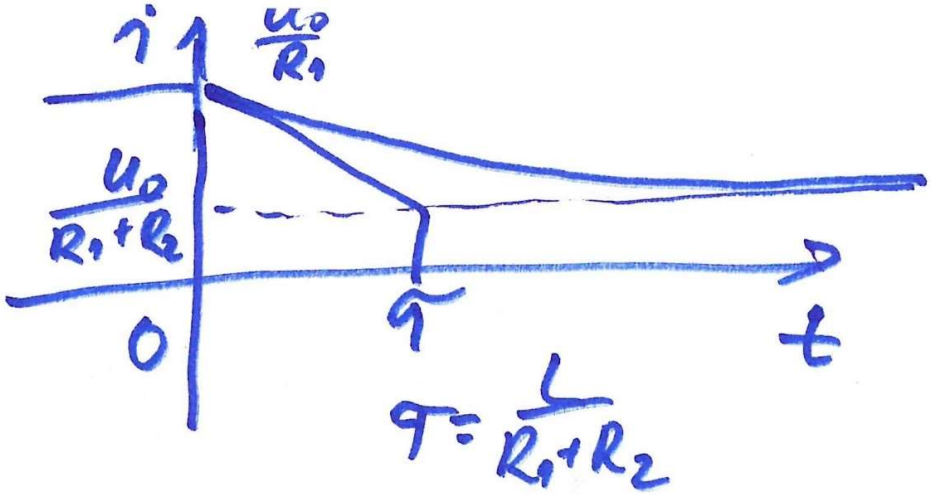
$$i(t) = Ke^{-\frac{t}{\tau}} + \frac{U_0}{R_1+R_2}$$

$$\frac{U_0}{R_1} = K + \frac{U_0}{R_1+R_2} \rightarrow K = \frac{U_0}{R_1} - \frac{U_0}{R_1+R_2}$$

$$K = U_0 \cdot \frac{R_2}{R_1(R_1+R_2)}$$

$$i(t) = \frac{U_0 R_2}{R_1(R_1+R_2)} e^{-\frac{t}{\tau}} + \frac{U_0}{R_1+R_2} =$$

$$= \frac{U_0}{R_1+R_2}\left(\frac{R_2}{R_1}e^{-\frac{t}{\tau}} + 1\right)$$



$$\tau = \frac{L}{R_1+R_2}$$