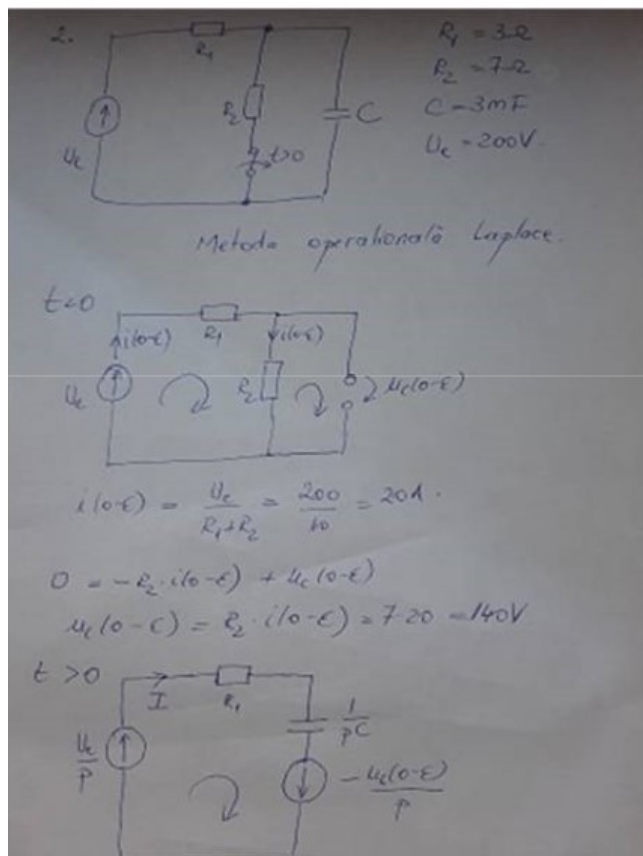


Metoda operationala



$$I \left(R_1 + \frac{1}{pC} \right) = \frac{U_c}{p} - \frac{U_c(0-)}{p}$$

$$I = \frac{\frac{U_c}{p} - \frac{U_c(0-)}{p}}{R_1 + \frac{1}{pC}} = \frac{U_c - U_c(0-)}{p \left(R_1 + \frac{1}{pC} \right)}$$

$$I = \frac{U_c - U_c(0-)}{p \cdot R_1 + \frac{1}{C}} = \frac{P_1(p)}{P_2(p) \cdot p + 0}$$

$$i(t) = \frac{P_1(p)}{P_2'(p)} \cdot e^{p \cdot t}$$

$$P_2(p) = 0$$

$$p \cdot R_1 + \frac{1}{C} = 0 \Rightarrow p = -\frac{1}{R_1 C} = -\frac{1}{9 \cdot 10^{-3}}$$

$$P_2'(p) = R_1 = 3$$

$$\tau = \left| \frac{1}{p} \right| = 9\text{ms}$$

$$P_1(p) = U_c - U_c(0-) = 200 - 140 = 60$$

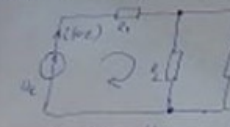
$$i(t) = \frac{60}{3} \cdot e^{pt} = 20 \cdot e^{pt}$$

Metoda analitica

1. $R_1 = 6\Omega$
 $R_2 = R_3 = 2\Omega$
 $L = 4mH$
 $U_c = 100V$
 $i(t) = ?$
 Reprezintă grafic?

Metoda analitică de rezoluție

1. $t = 0$ (înainte deșur)

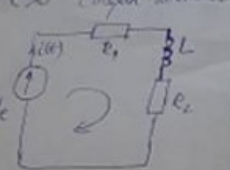


$$\frac{1}{R_3} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{6} + \frac{1}{6}$$

$$= \frac{2}{6} \Rightarrow R_{eq} = 3\Omega$$

$$i(0^-) = \frac{U_c}{R_1 + R_{eq}} = \frac{100}{6 + 3} = 20A$$

2. $t > 0$ (după închiderea lui R_3)



$$R_1 \cdot i + L \frac{di}{dt} + R_2 \cdot i = U_c$$

$$i(R_1 + R_2) + L \frac{di}{dt} = U_c$$

$$i(t) = i_p(t) + i_h(t)$$

$$(R_1 + R_2)ic + L \frac{di}{dt} = 0$$

$$(R_1 + R_2) \cdot K \cdot e^{\lambda t} + L \cdot \lambda \cdot K \cdot e^{\lambda t} = 0 \quad | : K \cdot e^{\lambda t}$$

$$R_1 + R_2 + L \cdot \lambda = 0 \Rightarrow \lambda = -\frac{R_1 + R_2}{L} = -\frac{10}{4 \cdot 10^{-3}}$$

Constanta de timp: $\tau = \left| \frac{1}{\lambda} \right| = \frac{4 \cdot 10^{-3}}{10} = 0.4ms$

$i_p(t) = A$

$$(R_1 + R_2) \cdot A + L \frac{dA}{dt} = U_c$$

$$\frac{dA}{dt} = 0$$

$$A = \frac{U_c}{R_1 + R_2} = \frac{100}{10} = 10$$

$i(t) = K \cdot e^{\lambda t} + 10$

\hookrightarrow se determină din condiția inițială ($t = 0$)

$$i(0^-) = i(0^+) = 20$$

$$20 = K \cdot e^0 + 10 \Rightarrow K = 10$$

$$i(t) = 10 \cdot e^{-\frac{t}{0.4}} + 10$$

$$i(t) = 10 \cdot e^{-\frac{t}{0.4}} + 10$$
