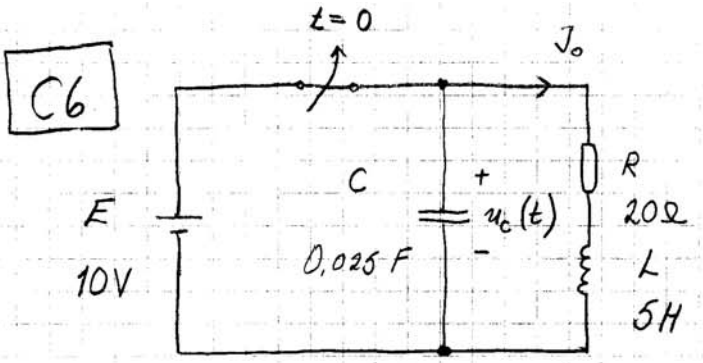
C6

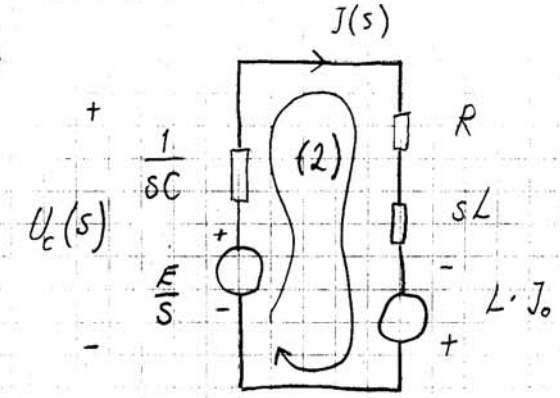


sök $u_c(t)$ för

$u_c(t) = E$ då $t < 0$

$$J_0 = \frac{E}{R} \rightarrow J_0 = 0{,}5\,A$$

Operatorschema



$$+\ U_c(s) = -\frac{1}{sC}\left(J(s)\right) + \frac{E}{s} \qquad \ldots (1)$$

$$\frac{E}{s} - \frac{1}{sC}\cdot J(s) - R\cdot J(s) - sL\cdot J(s) + L\cdot J_0 = 0 \qquad \ldots (2)$$

$$(2) \Rightarrow \quad J(s) = \frac{\frac{E}{s} + L\cdot J_0}{R + sL + \frac{1}{sC}} \qquad \text{ins i (1)} \rightarrow$$

$$\Rightarrow U_C(s) = \frac{E}{s} - \frac{1}{sC}\cdot\frac{\frac{E}{s} + L\cdot J_0}{R + sL + \frac{1}{sC}} \rightarrow$$

$$U_c(s) = \frac{10}{s} - \frac{1}{s \cdot 0{,}025} \cdot \frac{\frac{10}{s} + 5 \cdot 0{,}5}{20 + 5 \cdot 5 + \frac{1}{s \cdot 0{,}025}} =$$

$$= \frac{10}{s} - \frac{\frac{10}{s} + 2{,}5}{0{,}5s + 0{,}125s^2 + 1} =$$

$$= \frac{1{,}25s^2 + 5s + \cancel{10} - \cancel{10} - 2{,}5s}{0{,}125s\left(s^2 + 4s + 8\right)} =$$

$$= \frac{1{,}25s^2 + 2{,}5s}{0{,}125s\left(s^2 + 4s + 8\right)} =$$

$$= \frac{10s + 20}{s^2 + 4s + 8} = \frac{10(s+2)}{s^2 + 4s + 2^2 - 2^2 + 8} =$$

$$= \frac{10(s+2)}{(s+2)^2 + 2^2}$$

LAPLACEPARLOREN $\Longrightarrow$

$$u_c(t) = 10 \cdot e^{-2t} \cdot \cos 2t \; V$$