Einschalten eines RL-Kreises - Theorie - Lösung

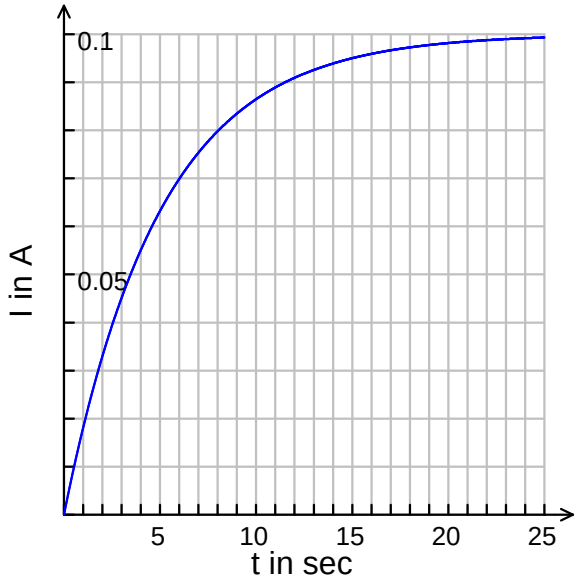
1.a)

$I(t) := I0 \cdot \left(1 - \exp\left(\frac{-R}{L} \cdot t\right)\right)$ "Done" $I0 := \frac{-U0}{R}$ $\frac{-u0}{r}$

$\frac{d}{dt}(I(t)) + \frac{R}{L} \cdot I(t) = \frac{-U0}{L}$ *true*

b)

$R := 1E2$ 100. $L := 5E2$ 500. $U0 := -10$ -10



delvar(R) "Done" delvar(L) "Done" delvar$(U0)$ "Done"

c)

$I(0)$ 0

d)

$\lim_{t \to \infty} (I(t)) = I0$

e)

$\text{round}\left(\frac{I\left(\frac{L}{R}\right)}{I0}, 2\right)$ .63

f)

$\text{solve}\left(I(t) = \frac{1}{2} \cdot I0, t\right)$ $t = \frac{l \cdot \ln(2)}{r}$

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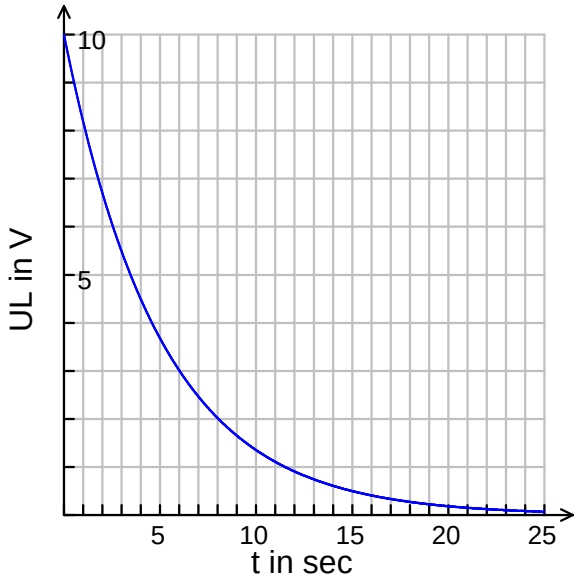
Einschalten eines RL-Kreises - Theorie - Lösung

2.a)

$\mathrm{UL}(t) := L\cdot\frac{d}{dt}(I(t))$ "Done" $\mathrm{UL}(t)$ $-u0\cdot e^{(-r\cdot t)/l}$

b)

$R := 1E2$ 100. $L := 5E2$ 500. $U0 := -10$ -10



$\mathrm{delvar}(R)$ "Done" $\mathrm{delvar}(L)$ "Done" $\mathrm{delvar}(U0)$ "Done"

c)

$\mathrm{UL}(0)$ $-u0$

d)

$\lim_{t\to\infty}(\mathrm{UL}(t)) = 0$

e)

$\mathrm{round}\left(\frac{\mathrm{UL}\left(\frac{L}{R}\right)}{-U0}, 2\right)$ .37

f)

$\mathrm{solve}\left(\mathrm{UL}(t) = \frac{1}{2}\cdot(-U0), t\right)$ $t = \frac{l\cdot\ln(2)}{r}$

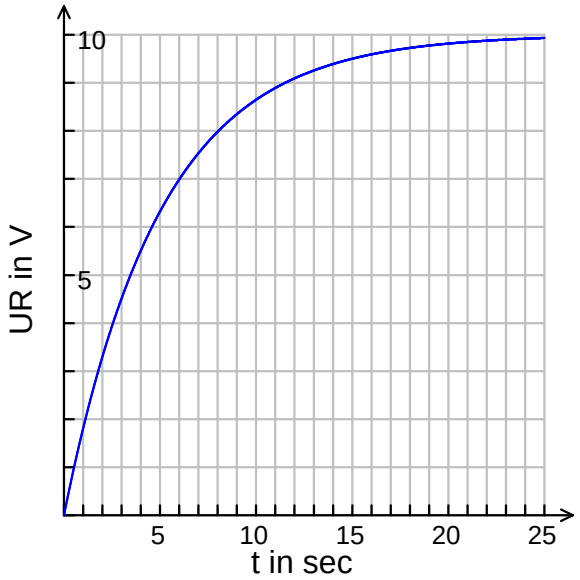
Einschalten eines RL-Kreises - Theorie - Lösung

3.a)

$\mathrm{UR}(t) := R \cdot I(t)$ "Done" $\mathrm{UR}(t)$ $-u0 \cdot \left(e^{(r \cdot t)/l} - 1\right) \cdot e^{(-r \cdot t)/l}$

b)

$R := 1E2$ 100. $L := 5E2$ 500. $U0 := -10$ -10



$\mathrm{delvar}(R)$ "Done" $\mathrm{delvar}(L)$ "Done" $\mathrm{delvar}(U0)$ "Done"

c)

$\mathrm{UR}(0)$ 0

d)

$\lim_{t \to \infty} (\mathrm{UR}(t)) = -U0$

e)

$\mathrm{round}\left(\frac{\mathrm{UR}\left(\frac{L}{R}\right)}{-U0}, 2\right)$ .63

f)

$\mathrm{solve}\left(\mathrm{UR}(t) = \frac{1}{2} \cdot (-U0), t\right)$ $t = \frac{l \cdot \ln(2)}{r}$