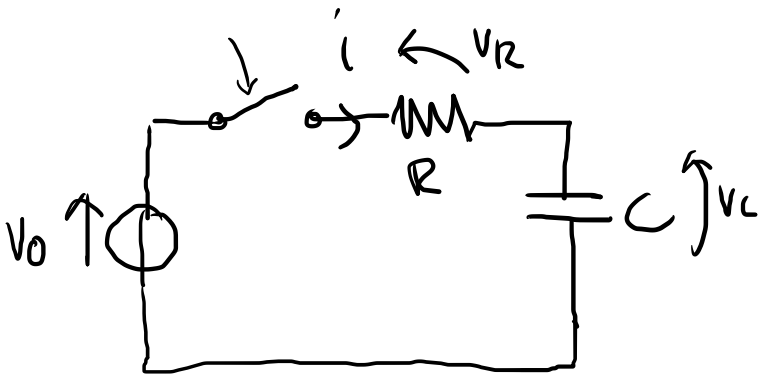
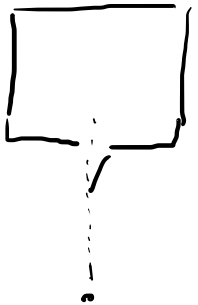
155 - RC τ





$$V_0 = V_R + V_C =$$

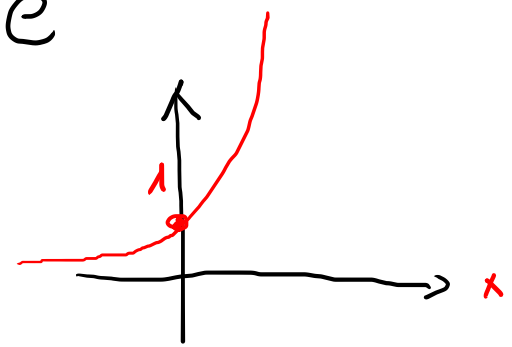
$$i = C \cdot \frac{dV}{dt} \qquad V_R = iR$$

$$\frac{dV_c}{dt} = \frac{i}{C} \qquad V_c(t) = \frac{1}{C}\int i \cdot dt$$

$$\uparrow \int \qquad \uparrow \int$$

$$e^x \rightarrow e^x$$

$$i(t) = I_0 e^{-\frac{t}{RC}}$$



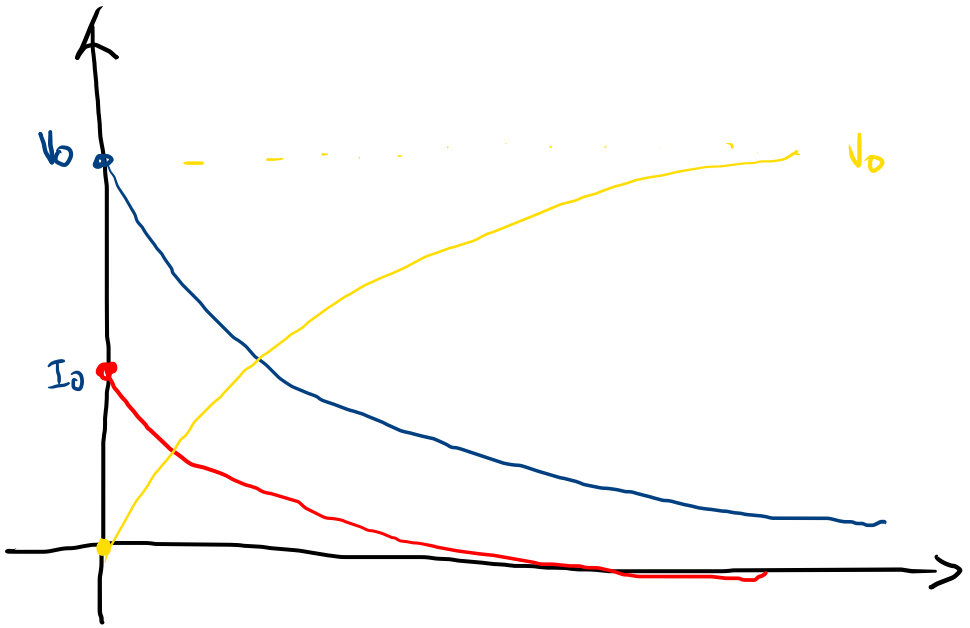
$$V_0 = iR + \frac{1}{C}\int i \cdot dt$$

$$\downarrow$$

$$0 = R \cdot \frac{di}{dt} + \frac{1}{C} \cdot i \qquad \sim i(t)$$

$$V_R = R \cdot I_0 e^{-\frac{t}{RC}} = V_0 e^{-\frac{t}{RC}} \leftarrow$$

$$V_C = \frac{1}{C}\int i\,dt = \frac{1}{C}\int_0^t I_0 \cdot e^{-\frac{t}{RC}}\,dt \rightsquigarrow V_C = V_0\left[1 - e^{-\frac{t}{RC}}\right]$$



$$i = I_0 \cdot e^{-\frac{t}{RC}}$$

$RC = \tau$

e^x

e^{-x}

$$V_c = V_0 \left(1 - e^{-\frac{t}{RC}}\right) \qquad t = RC$$

$$V_0 \left(1 - e^{-\frac{RC}{RC}}\right)$$

$$1 - e^{-1} \qquad 1 - \frac{1}{2{,}7} \sim \underline{0{,}63}$$

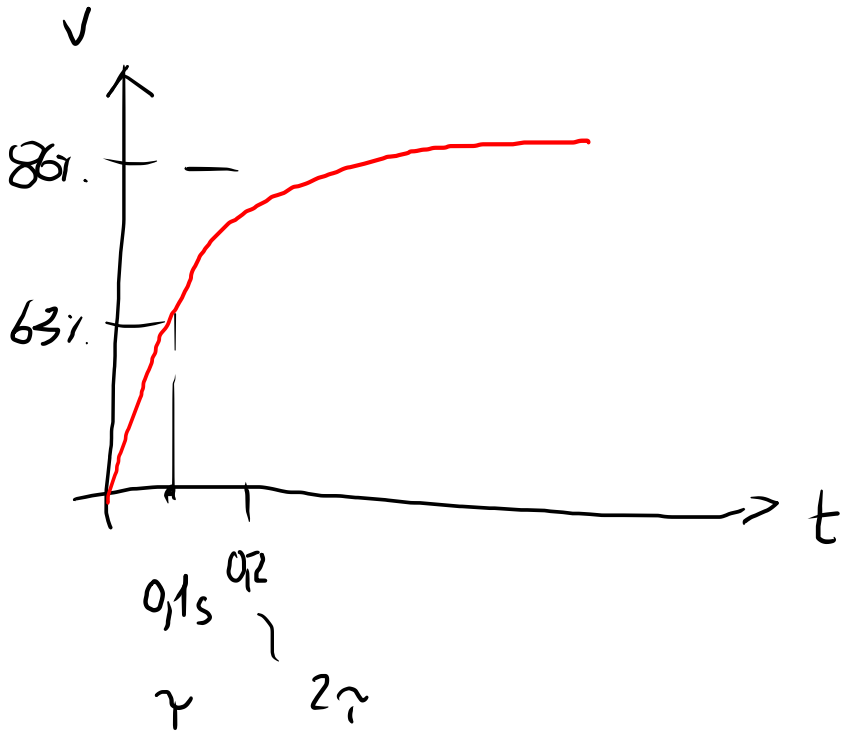
$2{,}7\ldots$

1

$$1 - e^{-\frac{2RC}{RC}} \qquad 1 - \frac{1}{2{,}7^2} \rightsquigarrow 0{,}86 \sim$$

$$\tau = RC = 100K \cdot 1\mu F = 100 \cdot 10^3 \cdot 1 \cdot 10^{-6} =$$

$$= 10^5 \cdot 10^{-6} = 10^{-1} = 0{,}1\,s$$


V
86%
63%
t
0,1s
0,2
τ
2τ