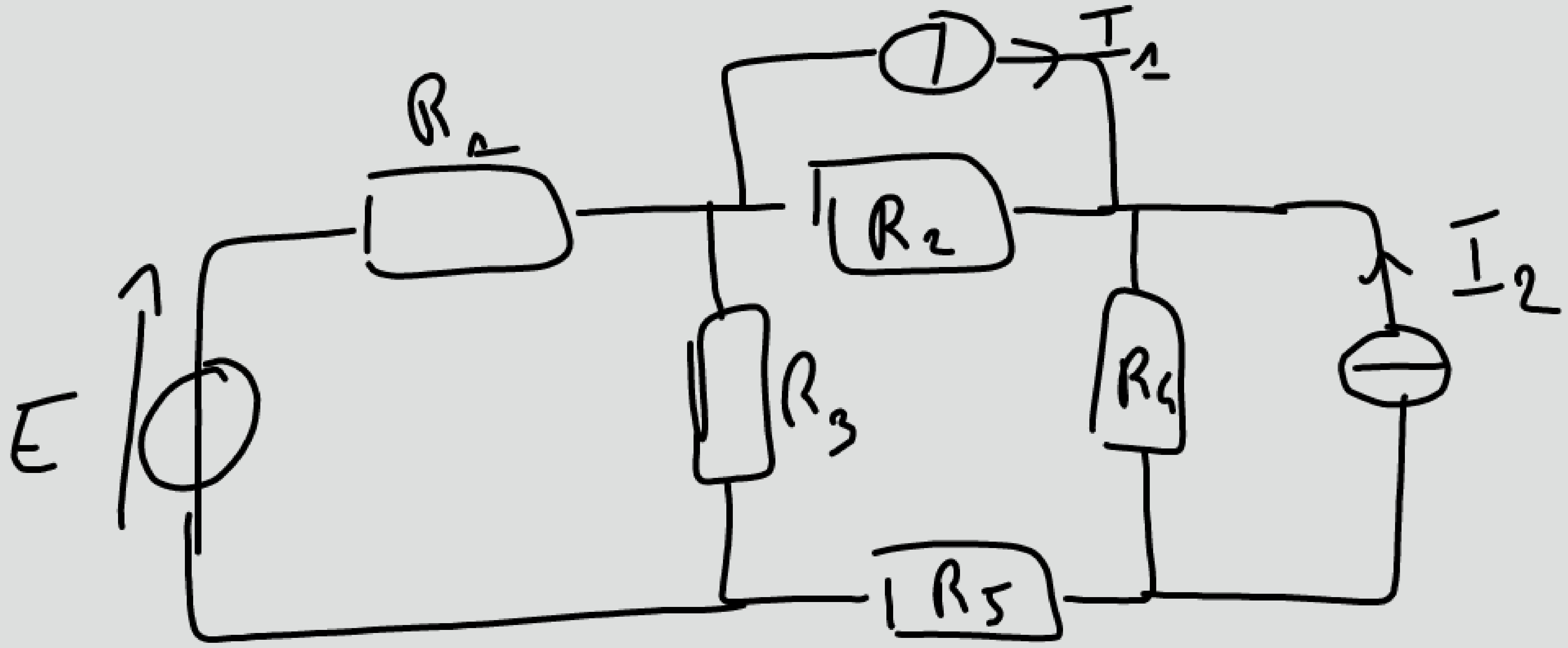
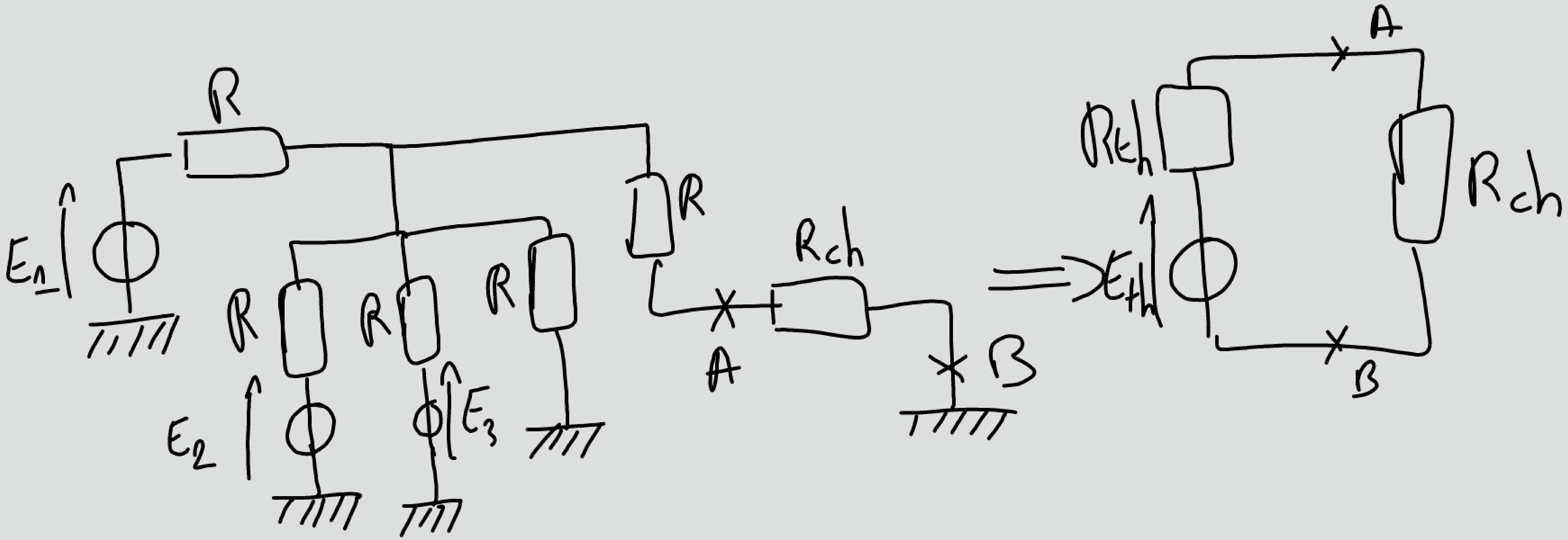


$$P = U \times I$$

$$P = R I^2$$

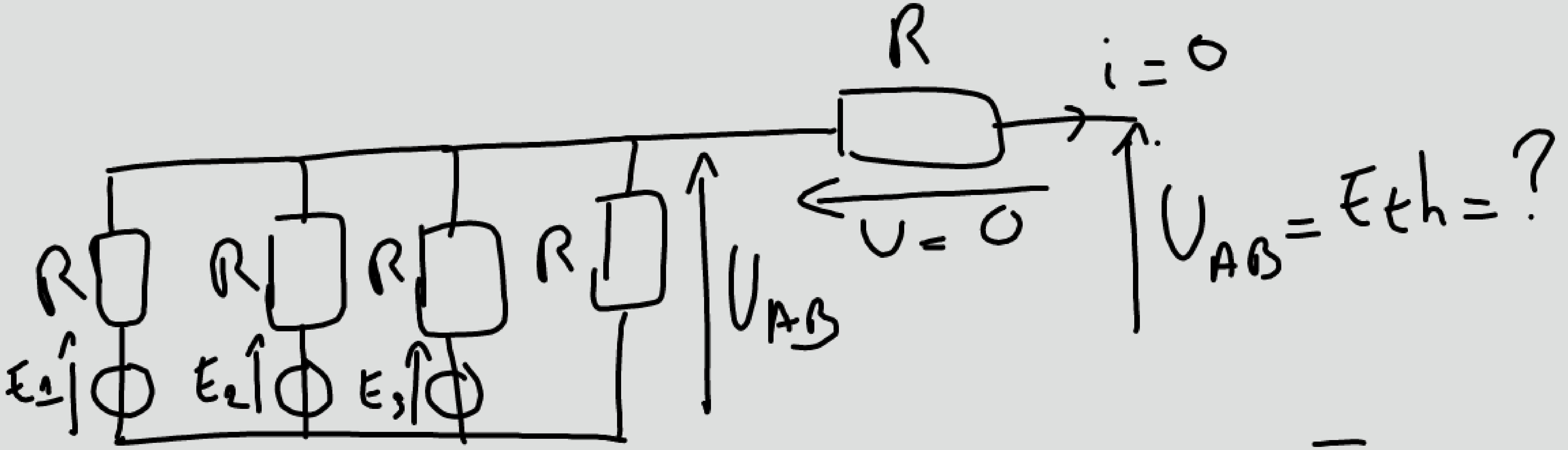
$$(a+b)^2 \neq a^2 + b^2$$



Pour trouver R_{th} : on éteint les géné et on calcule $R_{eq} = R_{th}$.

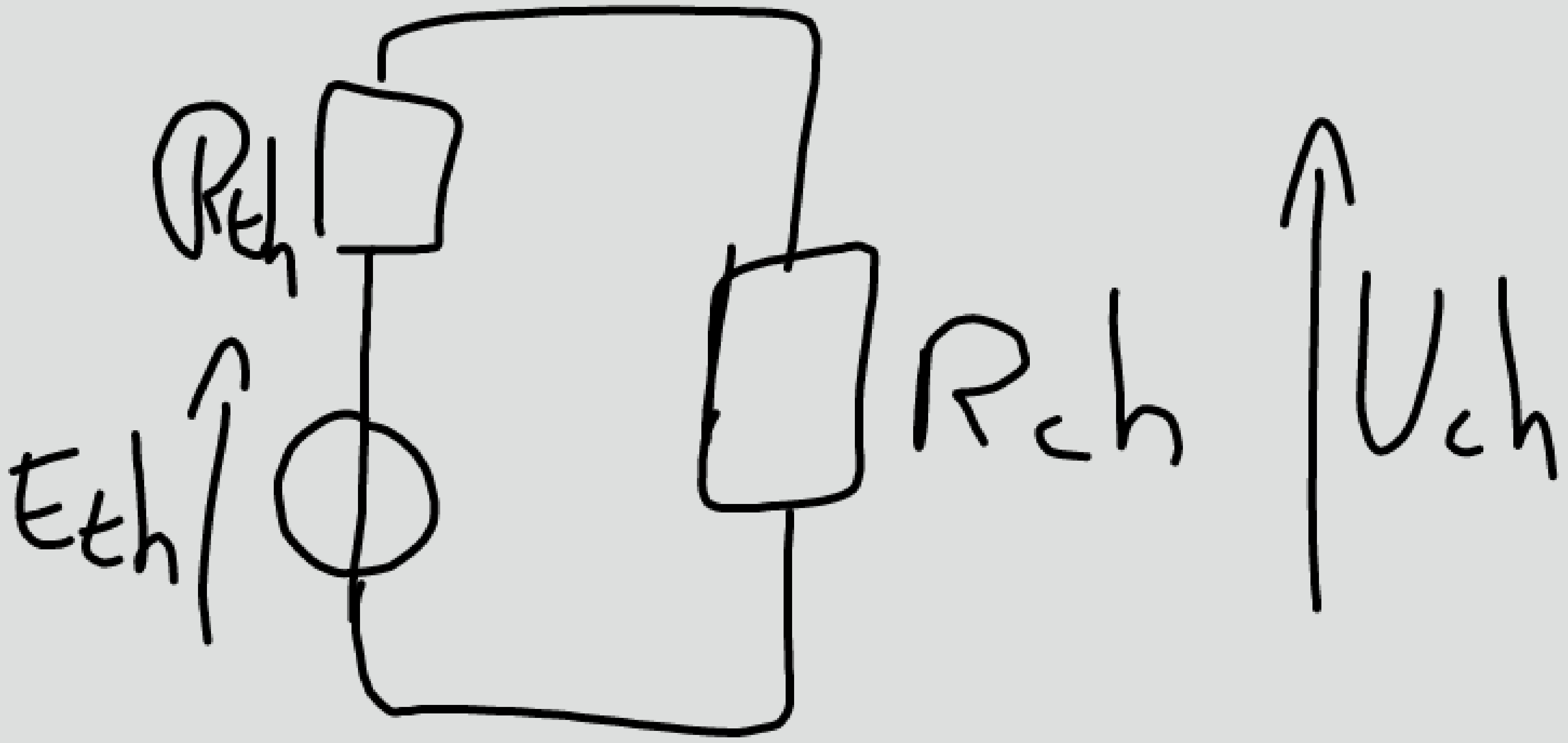
$$R_{th} = \frac{5R}{4}$$

Pour trouver Eth, on met un circuit ouvert entre A et B :



D'après Millman, $U_{AB} = \dfrac{\sum_i \frac{E_i}{R_i}}{\sum_i \frac{1}{R_i}} = \dfrac{\frac{E_1}{R} + \frac{E_2}{R} + \frac{E_3}{R} + \frac{0}{R}}{\frac{1}{R} + \frac{1}{R} + \frac{1}{R} + \frac{1}{R}}$

$$= \frac{(E_1 + E_2 + E_3)}{4} = E_{th}$$



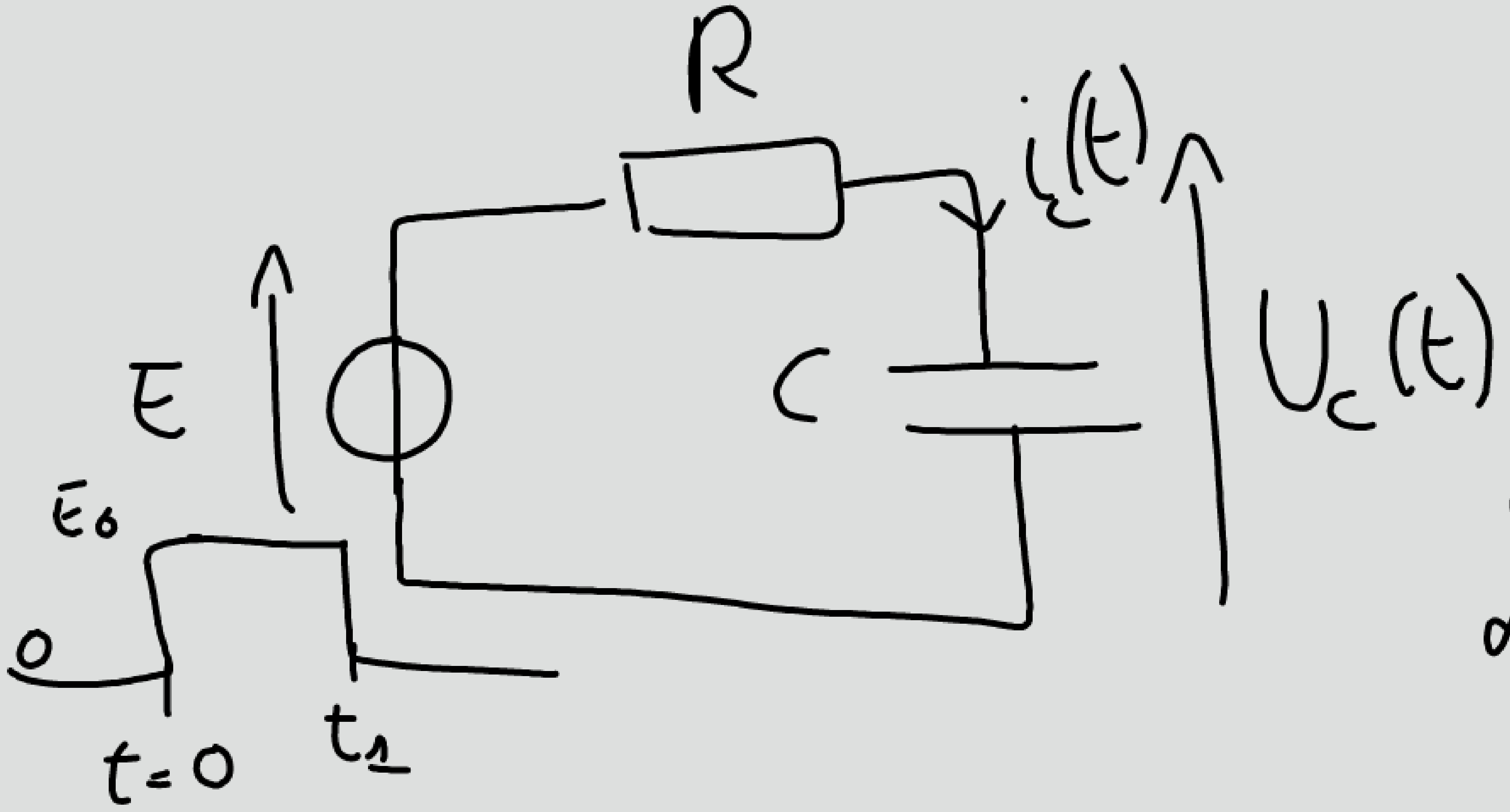
Diviseur de tension :

$$U_{ch} = \frac{R_{ch}}{R_{ch}+R_{th}} \times E_{th} = \frac{R}{R+\frac{5R}{4}} \times \frac{(E_1+E_2+E_3)}{4} = \frac{4}{9} \times \frac{E_1+E_2+E_3}{4}$$

$$= \frac{E_1+E_2+E_3}{9}$$

TD 3

Exercice 1 :



Loi des mailles :

$$E = U_R + U_c$$

$$E = Ri + U_c$$

$$E = RC\frac{dU_c}{dt} + U_c$$

La solution est de la forme

$$U_c(t) = Ae^{-t/RC} + B$$

Conditions aux limites :

À $t = 0$ $\quad U_c(t) = 0$ par lecture du circuit

$U_c(t) = Ae^{-0/RC} + B = A + B$ par la forme de la solution

$\Rightarrow 0 = A + B \Rightarrow A = -B$

À $t \to \infty$ $\quad U_c(\infty) = E_0$ par lecture du circuit

$U_c(\infty) = B$ par la forme de la solution

Finalement, $U_c(t) = -E_0 e^{-t/RC} + E_0 = E_0\left(1 - e^{-t/RC}\right)$

$$V = E - U_c(t)$$

$$V = E_0 - E_0\left(1 - e^{-t/RC}\right)$$

$$V(t) = E_0 e^{-t/RC}$$

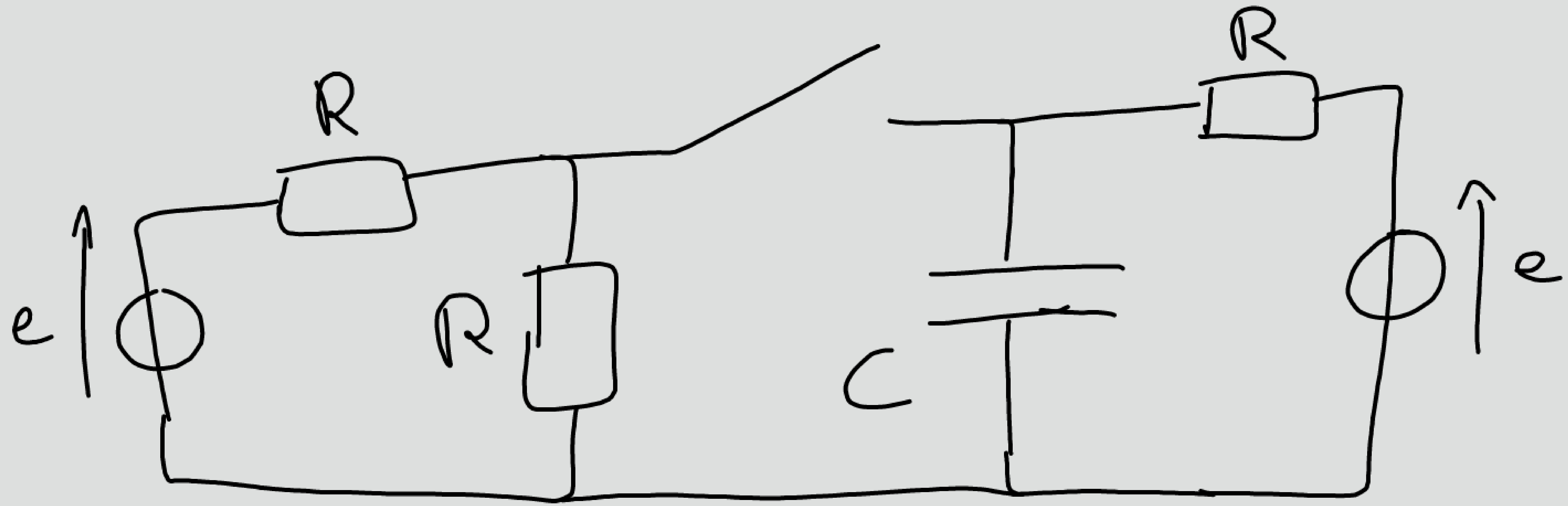
$$\tau = RC = 1k \times 1\mu = 1\,ms$$

$$t_1 = 50\,ms \gg \tau$$

$$t_2 = 2\,ms$$

E :

$E(t) = E_0$



R
e
R
C
R
e