Exo 1

(1) $C = A \times s$

(2) $$I = \frac{dQ}{dt} = \frac{qnSv\,dt}{dt} = qnSv \overset{q=-e}{=} -enSv$$

AN : $I = -1{,}6\cdot10^{-19} \times 2\cdot10^{29} \times 1\times10^{-6} \times 50\cdot10^{-6}$

$$= \underbrace{-1{,}6 \times \underbrace{100}_{10^{2}} \times \underbrace{10^{-19+29-6-6}}_{10^{-2}}}_{1}$$

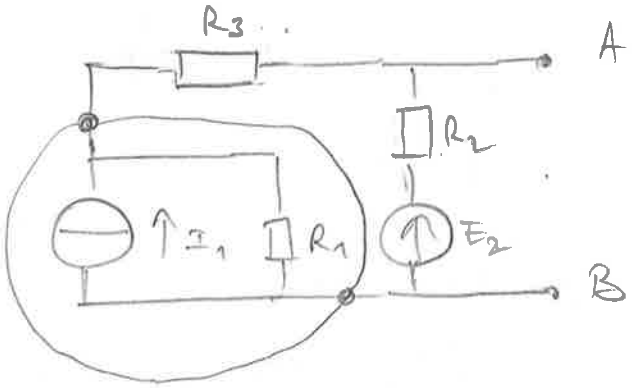
$= -1{,}6\ A$

Exo 2

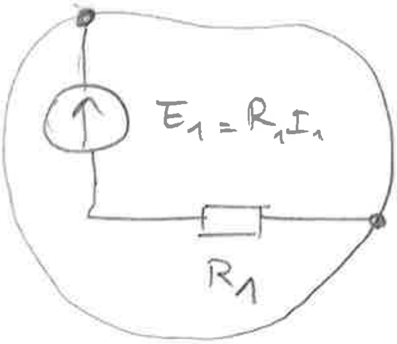
(1) Par application du pont diviseur de tension, on a
$$\begin{cases} u_1 = \dfrac{R_1}{R_1+R_2}\,u \\[2mm] u_2 = -\dfrac{R_2}{R_1+R_2}\,u \end{cases}$$

(2) $u_1 = \dfrac{u}{2} \iff R_1 = R_2$

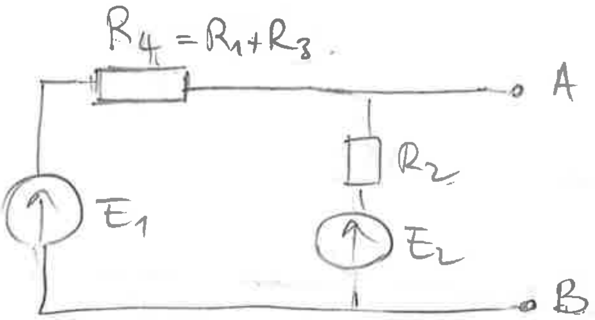
Exo 3.



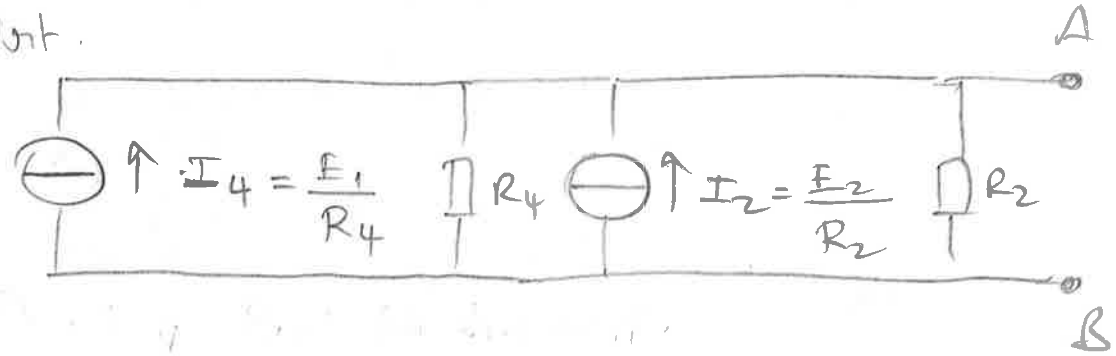
⇕ Th./Nort



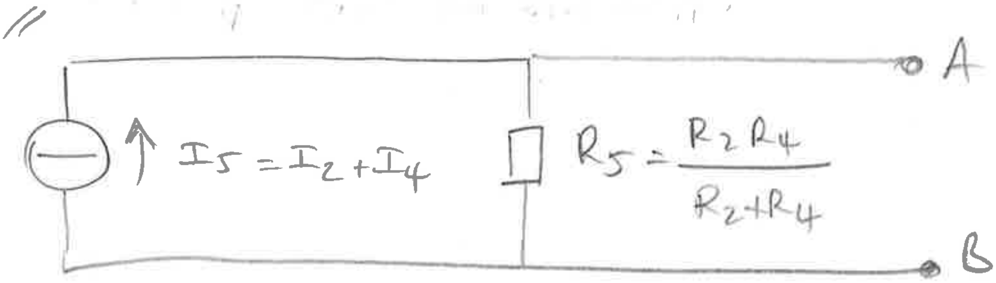
Alors R_1 et R_3 se retrouvent en série. Ainsi :



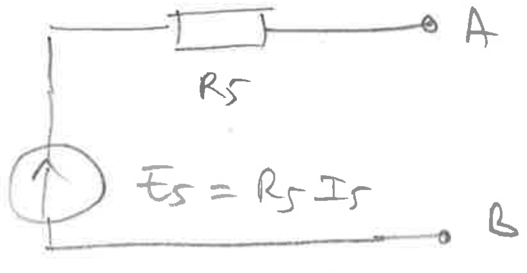
Th./Nort. ⇔



associate // ⇔



Th./Nort ⇔



Exo 4

(1) $u = V_A - V_B$.

(2) $i_1 = -\dfrac{u}{R_1}$

$i_2 = \dfrac{u}{2R_2}$

$u = E - Ri \iff i = \dfrac{E-u}{R}$.

$i = i_2 - i_1$

$$\Rightarrow \quad \frac{E-u}{R} = \frac{u}{2R_2} + \frac{u}{R_1}$$

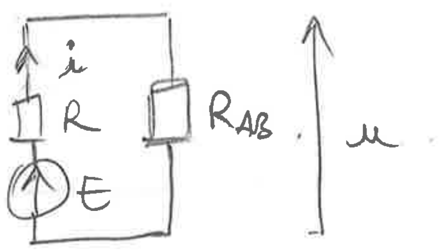
$$\iff u \times \left(\frac{1}{2R_2} + \frac{1}{R_1} + \frac{1}{R} \right) = \frac{E}{R}.$$

On pose R_{eq} tel que $\dfrac{1}{2R_2} + \dfrac{1}{R_1} = \dfrac{1}{R_{eq}}$.

Alors $u \times \left(\dfrac{1}{R_{eq}} + \dfrac{1}{R} \right) = \dfrac{E}{R}$.

$$\iff u = \frac{E/R}{1/R_{eq} + 1/R} = \frac{R_{eq}}{R + R_{eq}} \times E.$$

(3) R_2 et R_2 en série, R_1 en // avec $R_2 + R_2$ $\Rightarrow R_{AB} = \dfrac{2R_2 \times R_1}{R_1 + 2R_2} = R_{eq}$.



$i = \dfrac{E}{R + R_{AB}}$

$u = R_{AB} \times i = \dfrac{R_{AB}}{R + R_{AB}} \times E$.

m̂ expres° puisque $R_{AB} = R_{eq}$..