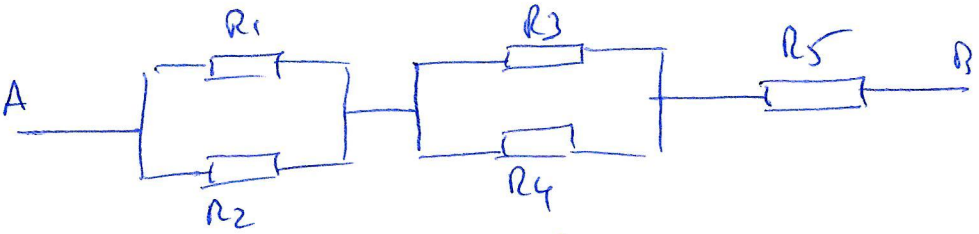
TD ASSOCIATION DE DIPOLES

Ex1



$$R_{eq} = (R_1 // R_2) + (R_3 // R_4) + R_5$$

$$= \frac{R_1 R_2}{R_1 + R_2} + \frac{R_3 R_4}{R_3 + R_4} + R_5$$

$$= 10 + 50 + 15$$

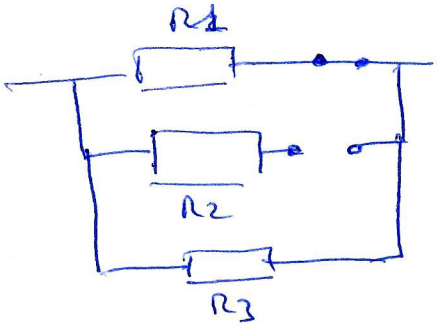
$$= 75\ \Omega$$

Ex2 * régime établi : $u_L = L \frac{di}{dt} = 0$ car i ne varie plus

→ L remplacée par un fil.

$i_c = C \frac{du_c}{dt} = 0$ car u_c ne varie plus

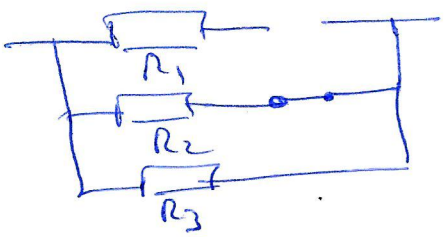
→ C équivalent à un circuit ouvert



$$R_{eq} = R_1 // R_3 = 50\ \Omega$$

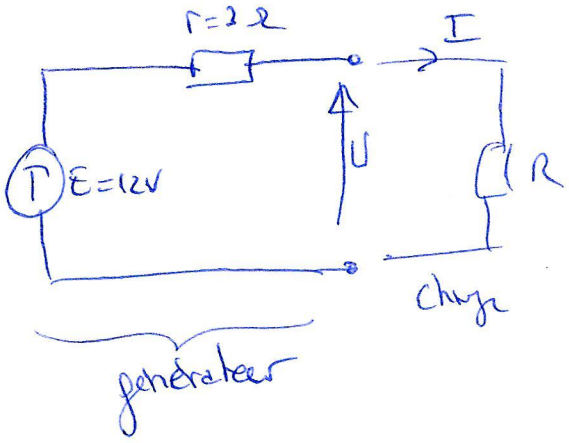
* à l'instant de mise sous tension : $i_L = 0$ et $u_C = 0$

$i_L = 0$ ↓ ouvert ; $u_C = 0$ ↓ fil



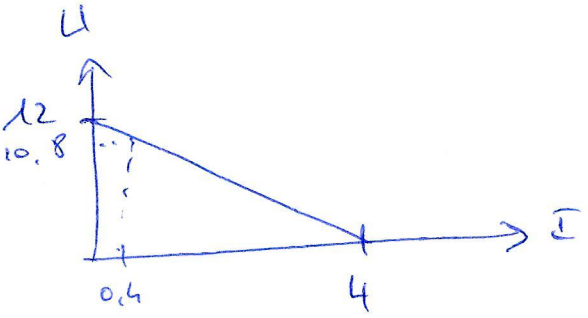
$$R_{eq} = R_2 // R_3 = \frac{1000 \times 100}{1000 + 100} = 90{,}9\ \Omega$$

Ex3|



$U = E - rI$

$U = 12 - 3I$ éq de droite



Si $R = 27\,\Omega$:

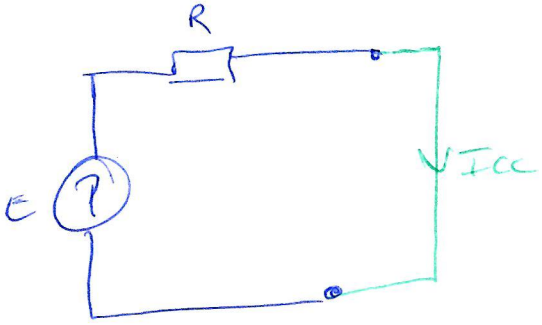
$$I = \frac{E}{r + R}$$

$$= \frac{12}{30} = 0{,}4\ A \rightarrow U = 12 - 3\times 0{,}4 = 10{,}8\ V$$

ou pont diviseur :

$$U = \frac{R}{R + r} E = 10{,}8\ V \quad (+ \text{ rapide})$$

Ex4|



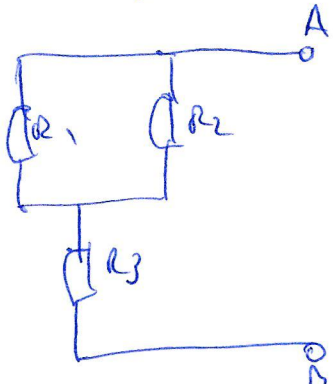
$R = 6r = 0{,}06\ \Omega$

$E = 6 \times e = 13{,}2\ V$

$$I_{cc} = \frac{E}{R} = \frac{13{,}2}{0{,}06} = 220\ A$$

Ex5| on cherche le modèle de Thevenin à gauche de A et B.

Rth : $R_{A \rightarrow B}$ sources éteintes

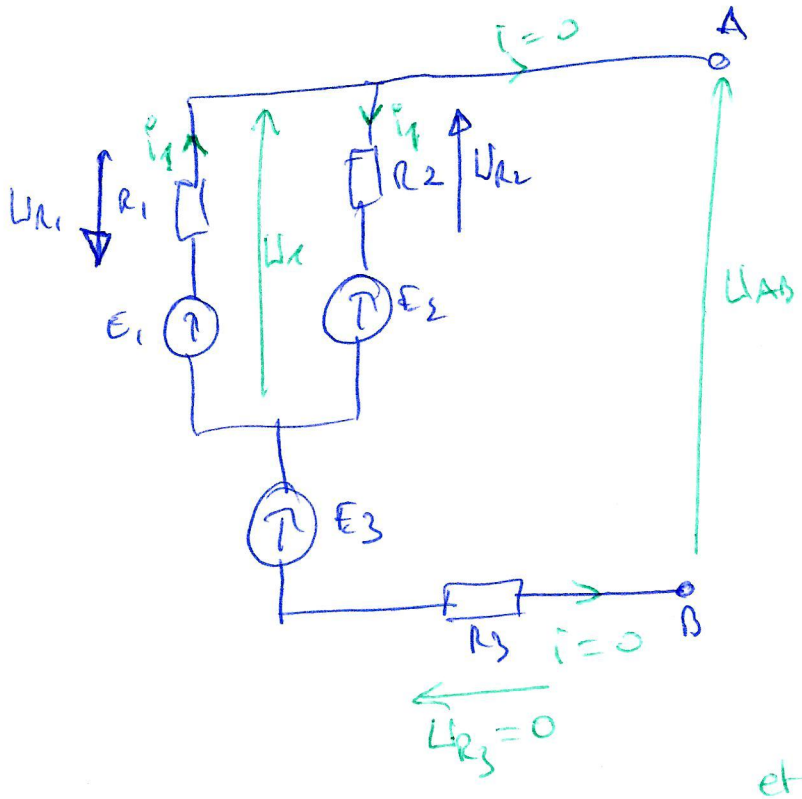


$R_{th} = R_1 // R_2 + R_3$

$= 1 + 2$

$= 3\ \Omega$

E_{th} : U_{AB} à vide.



$U_{AB} = U_1 + E_3 + U_{R3}$

$= U_1 + E_3$

maille : $E_1 - U_{R_1} - U_{R_2} - E_2 = 0$

$\rightarrow E_1 - (R_1 + R_2) i_1 - E_2 = 0$

$\rightarrow i_1 = \dfrac{E_1 - E_2}{R_1 + R_2}$

$= \dfrac{2}{4}$ A

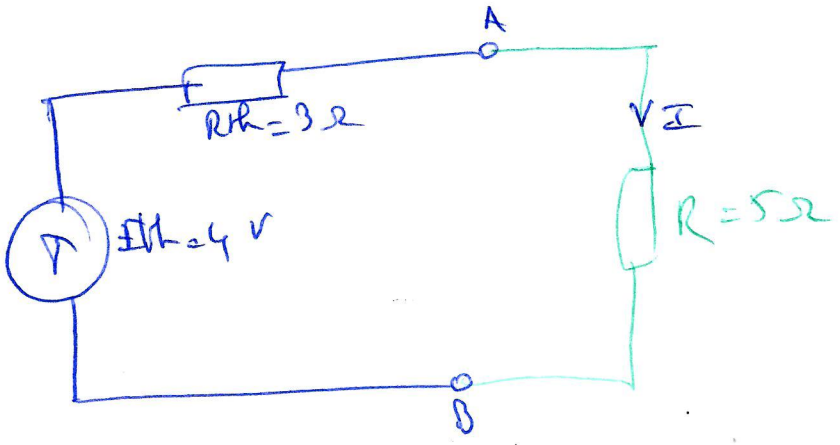
et $U_1 = R_2 i_1 + E_2$

$= 2 \cdot 0,5 + 1$

$= 2$ V

$\rightarrow U_{AB} = E_{th} = 2 + 2 = 4$ V

donc modèle :



$$I = \frac{E_{th}}{R_{th} + R} = \frac{4}{3 + 5} = 0,5 \text{ A}$$