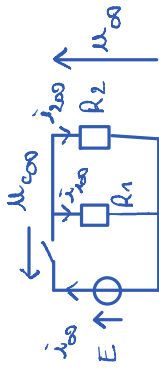


Chapitre 5

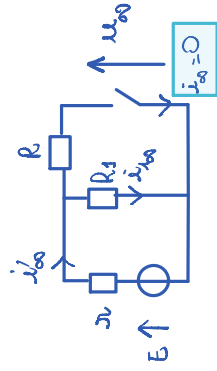
Application 1



$$i_{200} = 0 \text{ court-circuit}$$

$$i_{200} = i_{200} = 0$$

$$\text{loi des mailles : } E = u_{R1} + u_{200} \Rightarrow u_{200} = E$$

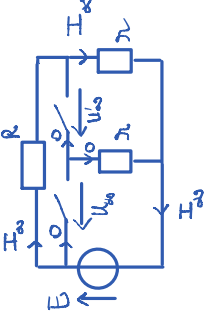


$$i_{200} = 0 \Rightarrow i_{200} = i_{200}$$

$$\text{loi des mailles : } E = u_{R1} + u_{200}$$

$$i_{200} = i_{200} = \frac{E}{R_1 + R_2}$$

$$\text{tension aux bornes de } R \Rightarrow u_{R1} = R_1 i_{200} = R_1 \frac{E}{R_1 + R_2}$$

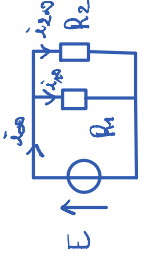


$$E = (R_1 + R_2) i_{200} \Rightarrow i_{200} = \frac{E}{R_1 + R_2}$$

$$E = u_{R1}$$

$$E = u_{R1} + u_{200} + R_2 i_{200} \quad u_{200} = -R_2 \frac{E}{R_1 + R_2}$$

Application 2

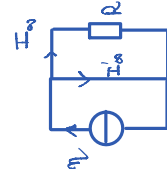


$$R_1/R_2 : R_{eq} = \frac{R_1 R_2}{R_1 + R_2}$$

$$\text{partie division de courant}$$

$$i_{200} = i_{200} \frac{R_2}{R_1 + R_2}$$

$$i_{200} = i_{200} \frac{R_1}{R_1 + R_2}$$



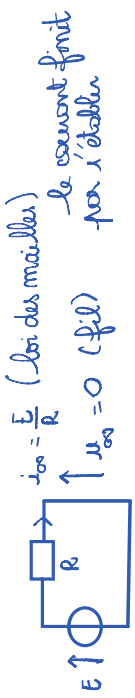
$$R \text{ est court-circuité}$$

$$i_{200} = 0$$

$$i_{200} = \eta$$

Application 3

1) Régime permanent :



$$i_{00} = \frac{E}{R} \text{ (loi des mailles)}$$

le courant finit par s'établir

2) Régime transitoire :

$$\text{loi des mailles : } E = u + R i \text{ ou } u = L \frac{di}{dt} \rightarrow L \frac{di}{dt} + R i = E$$

$$\text{Forme canonique : } \frac{di}{dt} + \frac{R}{L} i = \frac{E}{L} \text{ on identifie } \tau = \frac{L}{R}$$

$$\text{4) solution : } i(t) = A \exp\left(-\frac{t}{\tau}\right) + \frac{E}{R} \quad A \in \mathbb{R} \quad \text{solution particulière } = i_{00}$$

$$\text{CA : } i(0^+) = i(0^-) = 0 \rightarrow i(0) = 0 \quad A = -\frac{E}{R} \quad i(t) = \frac{E}{R} \left(1 - \exp\left(-\frac{t}{\tau}\right)\right)$$

$$\text{5) expression de } u(t) \quad u = L \frac{di}{dt} \text{ ou } u = E - R i \quad u(t) = E \exp\left(-\frac{t}{\tau}\right)$$

Application 4

1) Régime permanent :



le courant finit par s'établir

$$i_{00} = 0 \quad u_{00} = 0 \text{ (fil)}$$

2) Régime transitoire :

$$\text{loi des mailles : } 0 = u + R i \text{ ou } u = L \frac{di}{dt} \rightarrow L \frac{di}{dt} + R i = 0$$

$$\text{Forme canonique : } \frac{di}{dt} + \frac{R}{L} i = 0$$

$$\text{on identifie } \tau = \frac{L}{R}$$

$$\text{solution : } i(t) = A \exp\left(-\frac{t}{\tau}\right) \quad A \in \mathbb{R} \quad \text{(pour la solution particulière : } i_{00} = 0)$$

$$\text{CA : } i(0^+) = i(0^-) = 0 \rightarrow i(0) = 0 \quad A = \frac{E}{R}$$

$$i(t) = \frac{E}{R} \exp\left(-\frac{t}{\tau}\right)$$

3) expression de u(t) : u = L di/dt ou u = -R i ...

$$u(t) = -E \exp\left(-\frac{t}{\tau}\right)$$

