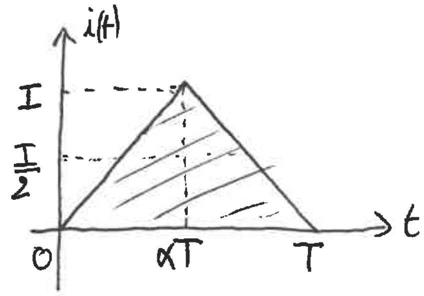
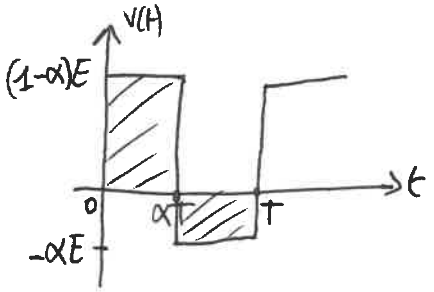
AD1 TD 30 groupe 10

1.)

$$i(t) = \begin{cases} \dfrac{t}{\alpha T} I & \text{si } 0 \leq t < \alpha T \\ \dfrac{t - T}{\alpha T - T} I & \text{si } \alpha T \leq t < T \end{cases}$$



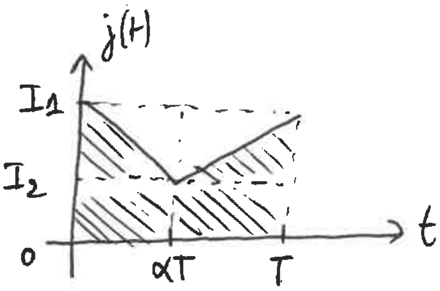
$$\langle i(t) \rangle = \frac{1}{T}\int_0^T i(t)dt = \frac{1}{T} \cdot \frac{I\,T}{2} = \frac{I}{2}$$



$$\langle V(t) \rangle = \frac{1}{T}\int_0^T V(t)dt = \frac{1}{T}\left(\int_0^{\alpha T} V(t)dt + \int_{\alpha T}^{T} V(t)dt\right)$$

$$= \frac{1}{T}\left(\alpha T(1-\alpha)E + (T-\alpha T)\cdot(-\alpha E)\right)$$

$$= \alpha(1-\alpha)E - (1-\alpha)(\alpha E) = 0$$ B



$$\langle j(t) \rangle = \frac{1}{T}\left(\int_0^{\alpha T} j(t)dt + \int_{\alpha T}^{T} j(t)dt\right)$$

$$= \frac{1}{T}\left(I_2 \cdot \alpha T + \left(\frac{(I_1 - I_2)\alpha T}{2}\right)\right)$$

$$+ \frac{1}{T}\left(I_2 \cdot (T-\alpha T) + \frac{(I_1 - I_2)(T-\alpha T)}{2}\right)$$

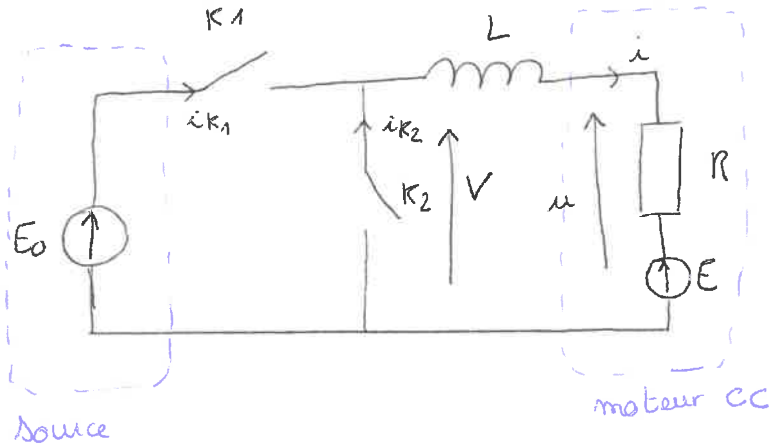
$$= \frac{1}{T}\left(I_2 \alpha T + \frac{(I_1 - I_2)\alpha T}{2} + I_2(T-\alpha T) + \left(\frac{(I_1 - I_2)(T-\alpha T)}{2}\right)\right)$$

$$= I_2 \alpha + \frac{(I_1 - I_2)}{2}\alpha + I_2(1-\alpha) + \frac{(I_1 - I_2)(1-\alpha)}{2}$$

$$= \frac{(I_1 - I_2)}{2}(\alpha + 1 - \alpha) + I_2(\alpha + 1 - \alpha) = \frac{I_1 - I_2}{2} + I_2 = \frac{I_1 + I_2}{2}$$

TD 30 - AD 2

Groupe 4

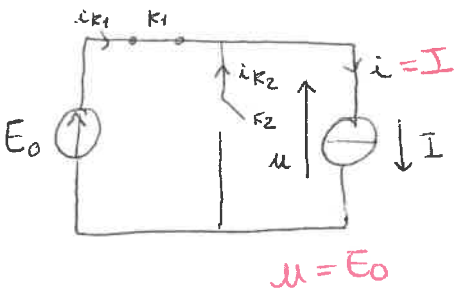


1. Un interrupteur idéal ne consomme pas de puissance ✓
↳ les commutations sont instantanées.

2. La bobine L assure la continuité de $i(t)$ et diminue l'amplitude de l'ondulation ✓

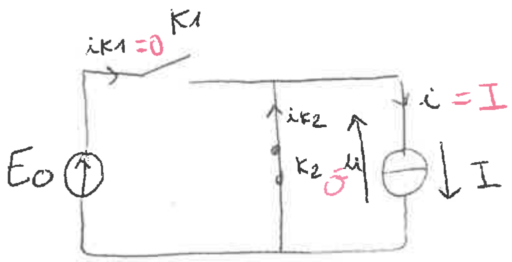
On peut remplacer le moteur CC et la bobine par une source de courant parfaite ✓

3. * Circuit 1, K_1 fermé et K_2 ouvert



Ce circuit est possible car la source de tension est connectée à une source de courant ✓

* Circuit 2, K_1 ouvert et K_2 fermé

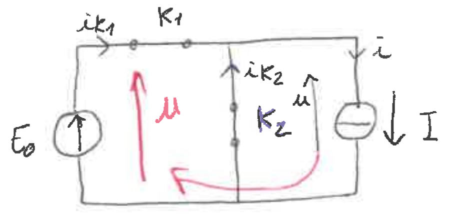


$i_{K1} = 0$ possible pour une source de tension

Ce circuit ~~n'est pas~~ possible car :

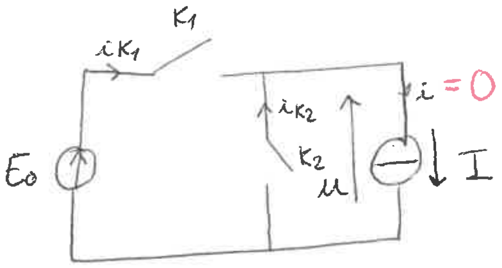
- $u = 0$ qui ~~n'est pas~~ possible pour une source de ~~tension et~~ courant
- $i = I$ qui n'est pas possible pour une source de courant

* Circuit 3, K_1 et K_2 fermés



Ce circuit n'est pas possible car $u = 0$ qui n'est pas possible pour une source de tension

* Circuit 4, K_1 et K_2 ouverts

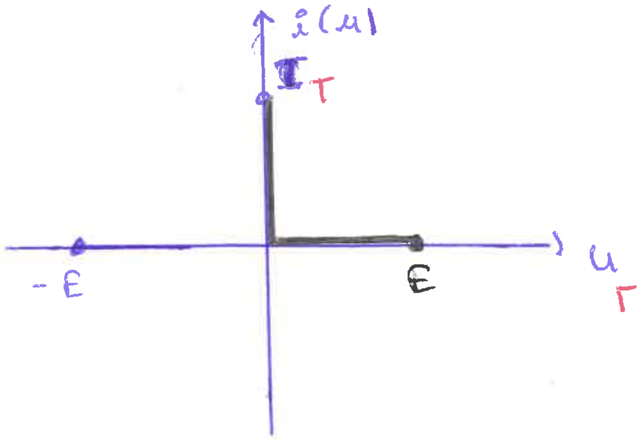


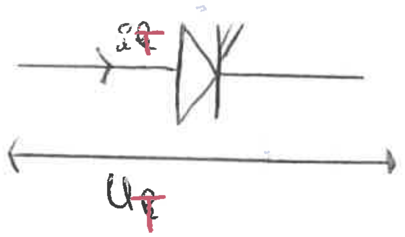
Ce circuit n'est pas possible car $i = 0$ qui n'est pas possible pour une source de courant

TD

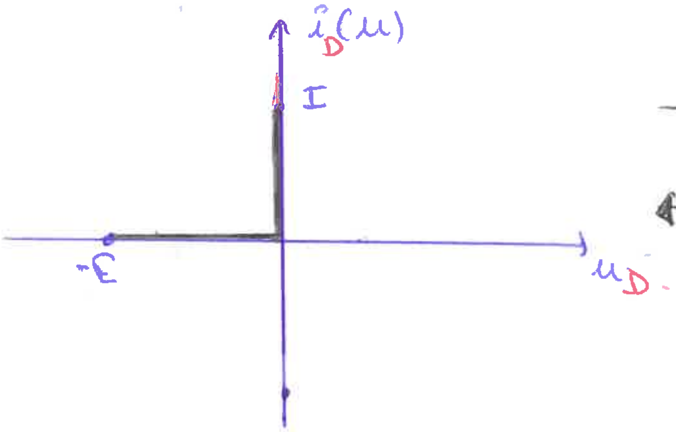
AD30 TD 3 — groupe 6

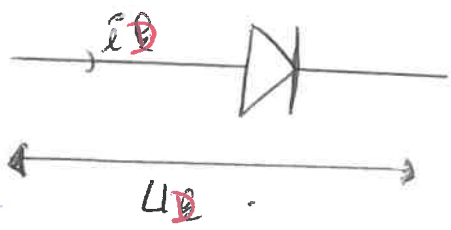
a) Pour un transistor, on a :



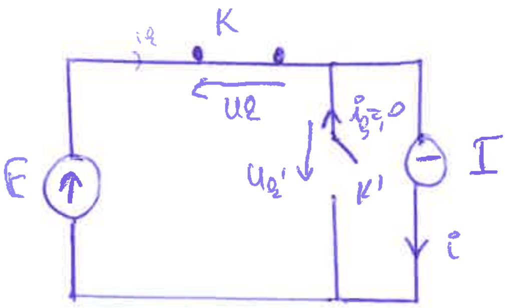


• Pour une diode, on a :

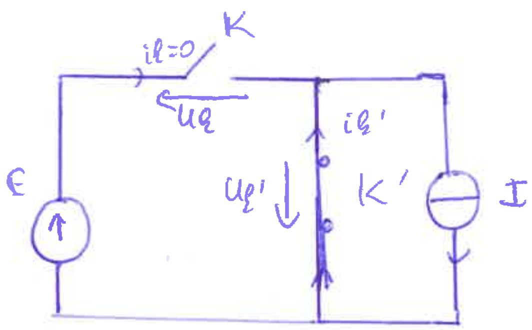




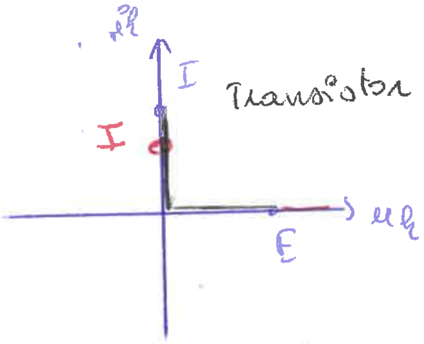
b) • Pour $t \in [0, \alpha T]$

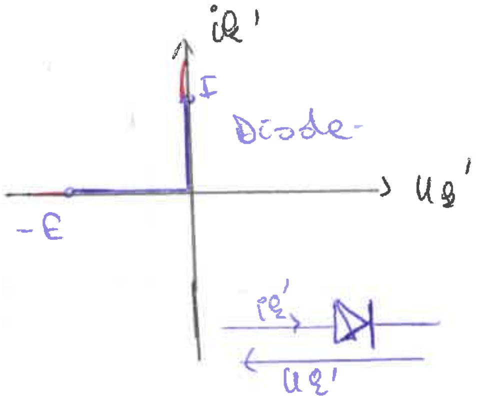


Pour $t \in [\alpha T, T]$.

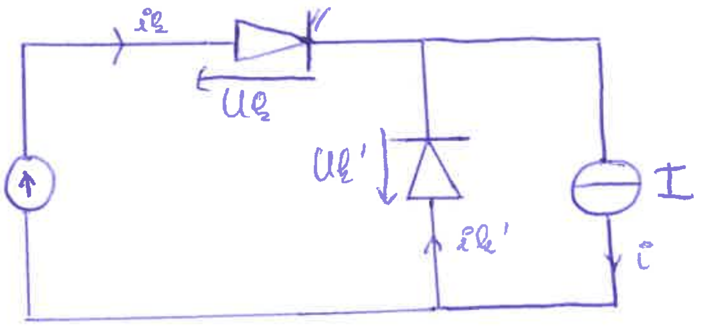


	i_Q	u_Q	i_Q'	u_Q'
$[0, \alpha T]$	I	0 K fermé	0	-E K' ouvert
$]\alpha T, T]$	0	E K ouvert	I	0 K' fermé

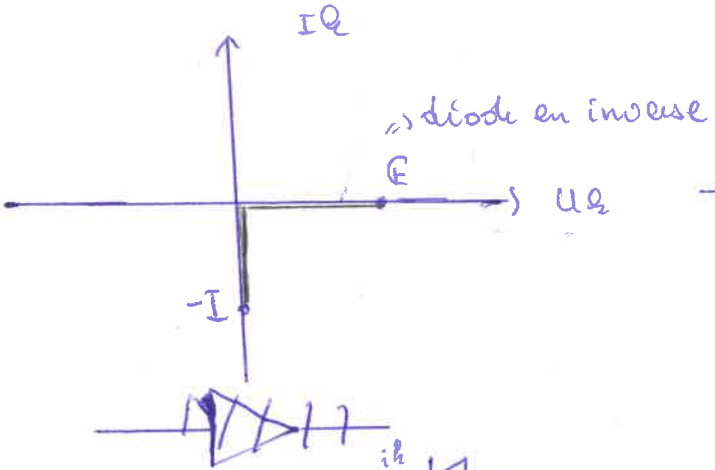


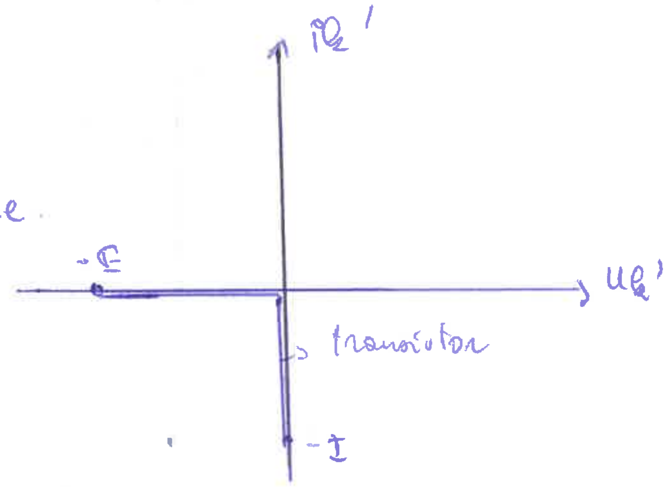


- Ainsi le schéma devient

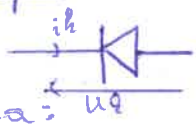


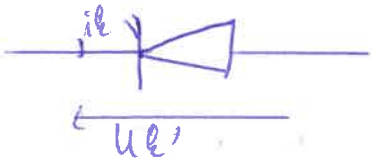
- c) lorsque $i < 0$, on aura :



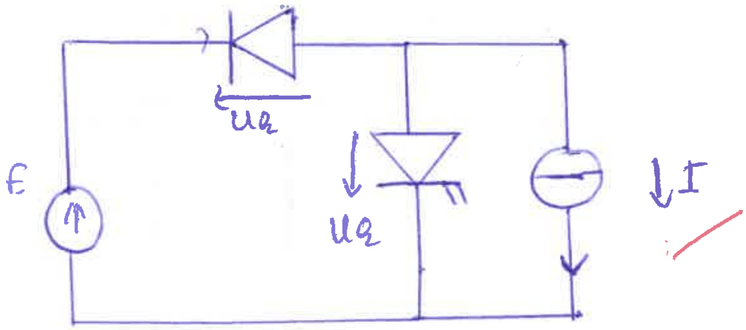


~~Ainsi~~

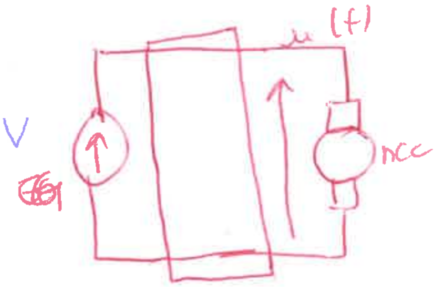




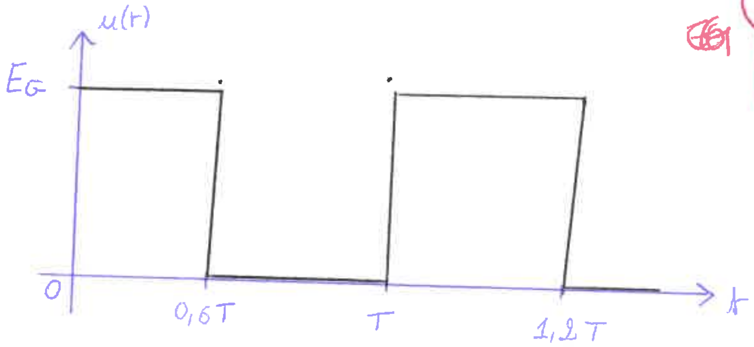
d) Ainsi le schéma sera :



TD 30 - AD4 - (Groupe 2)



1) On a $\alpha = 0{,}6$ et $E_G = 150V$

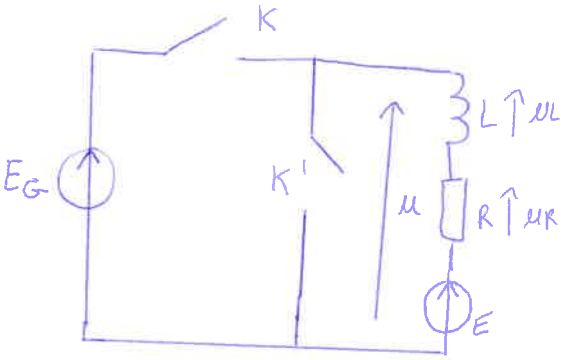


tension moyenne : $\langle u(t) \rangle = \frac{1}{T} \times$ Aire sous la courbe

$= \frac{1}{T} \times E_G \times \alpha T = \alpha E_G = 0{,}6 \times 150$

$= 90 V$

2)



3) $u(t) = E + Ri + L\frac{di}{dt}$ donc $\langle u(t) \rangle = \langle E \rangle + \langle Ri \rangle + \langle L\frac{di}{dt} \rangle$ (0)

$= E + R\langle i(t) \rangle$

4) $\langle i(t) \rangle = \frac{\langle u(t) \rangle - E}{R} = \frac{\alpha E_G - E}{R} = \frac{90 - 80}{1{,}5} \simeq 6{,}7 A$