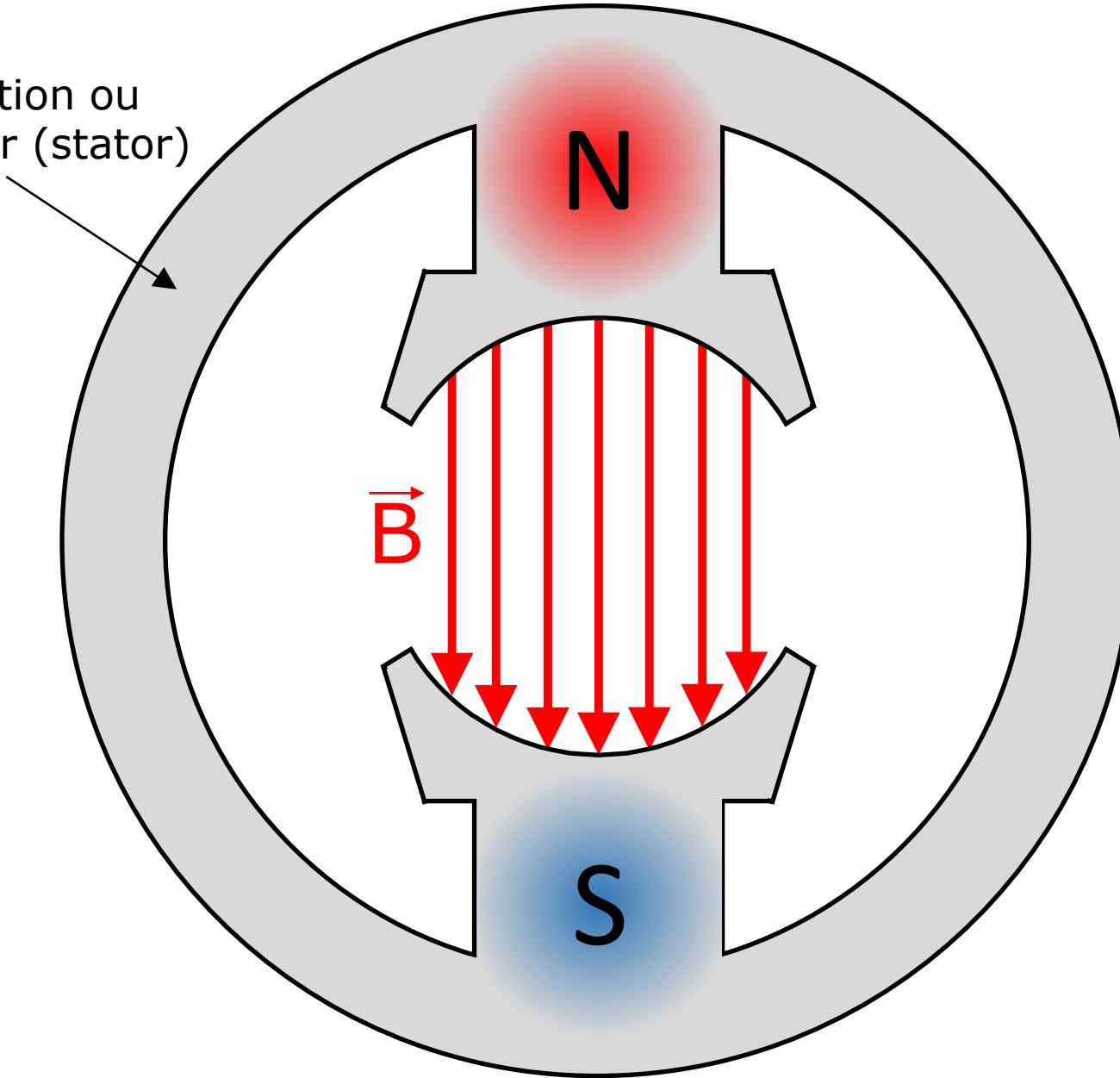


Le moteur à courant continu

Le moteur DC

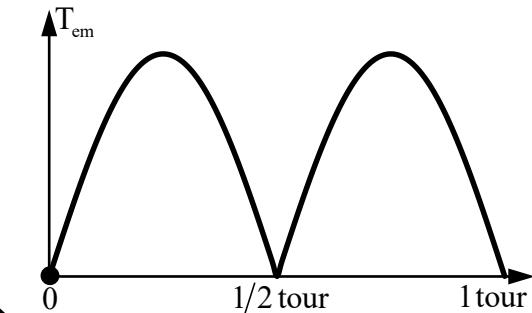
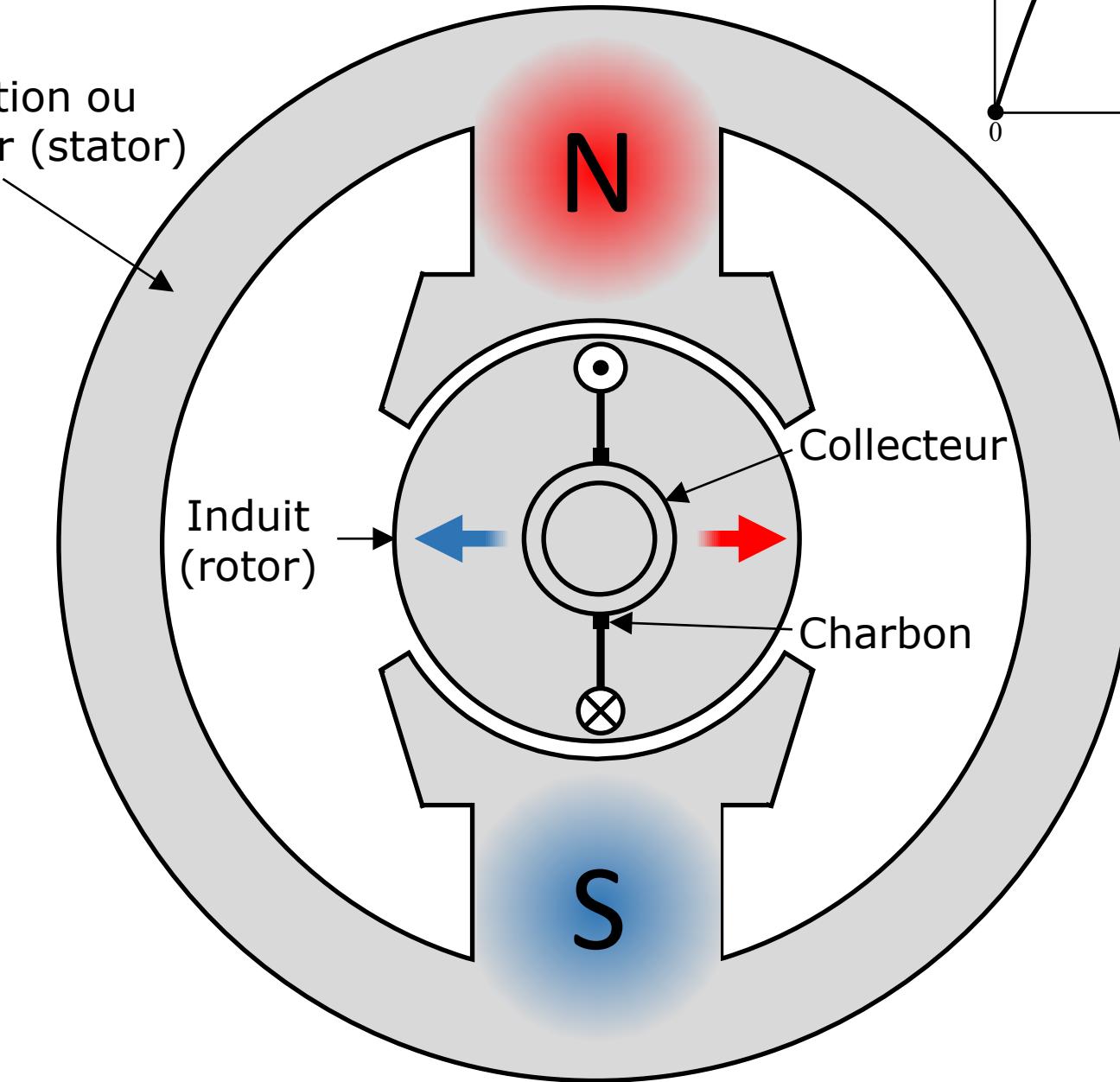
Principe de fonctionnement

Excitation ou
inducteur (stator)



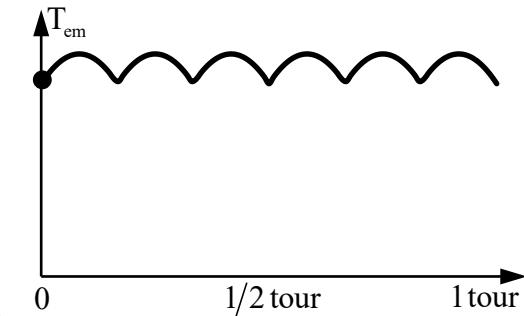
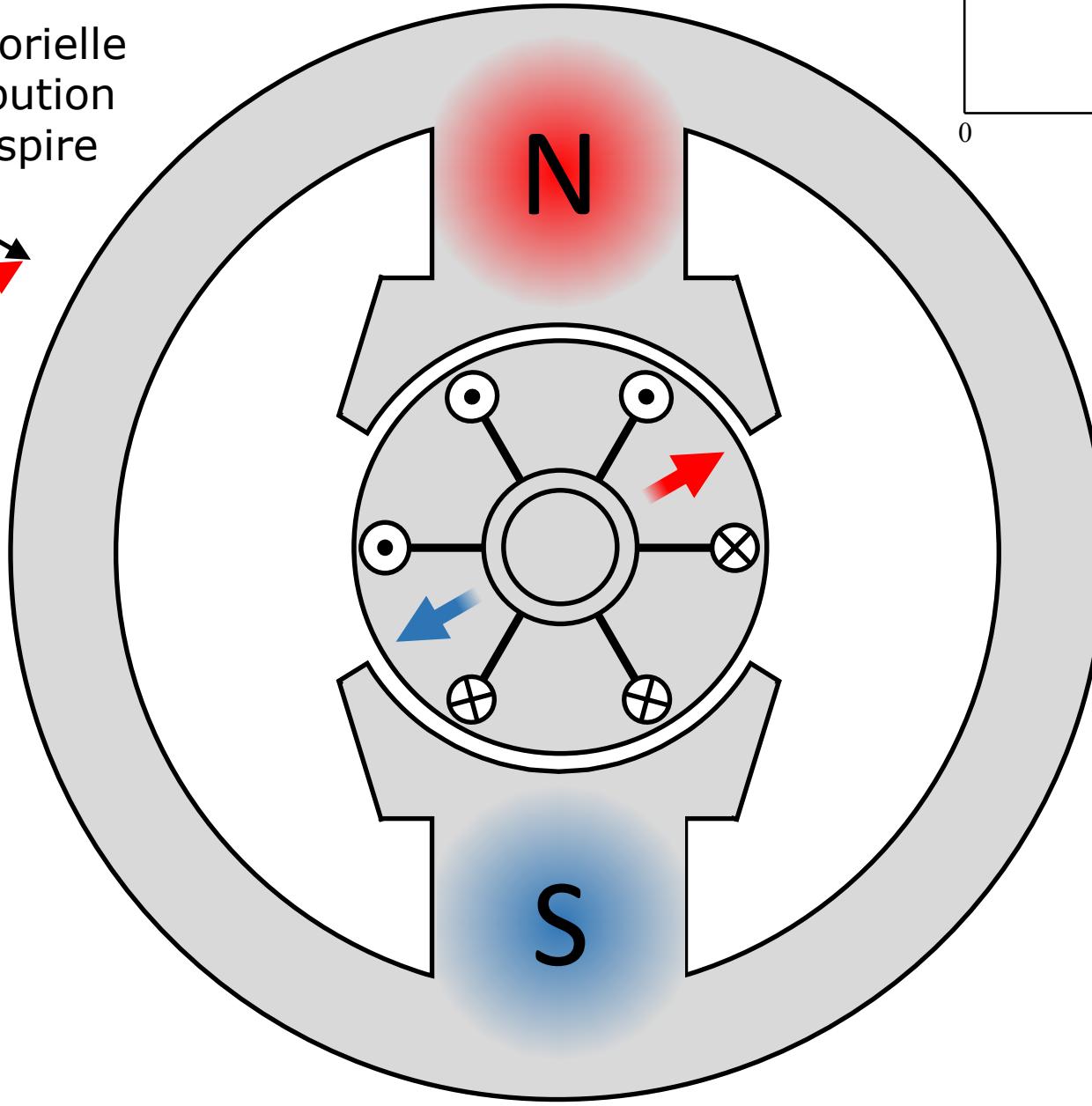
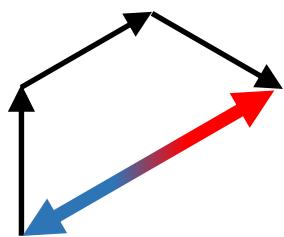
Principe de fonctionnement

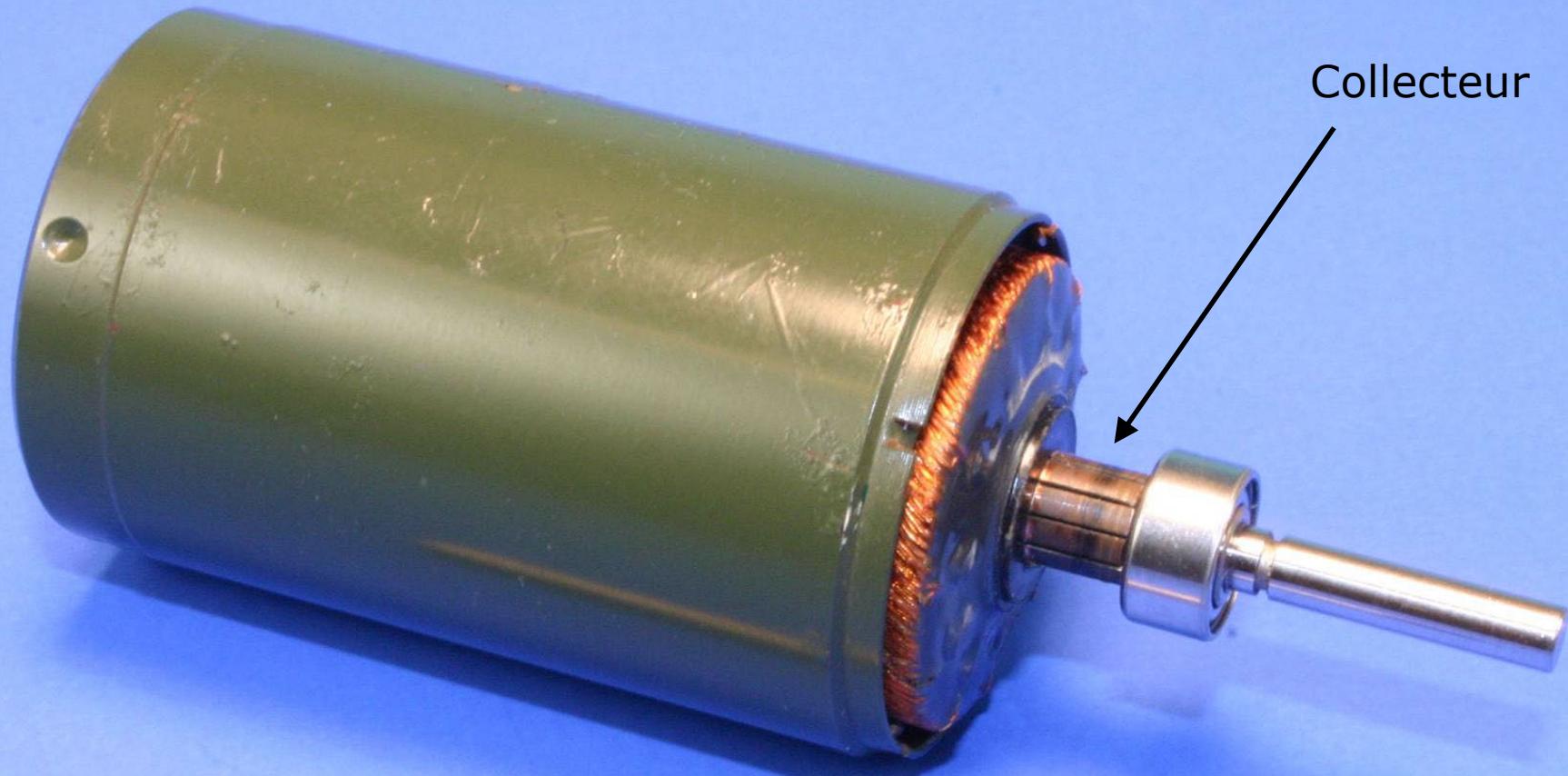
Excitation ou
inducteur (stator)



Principe de fonctionnement

Somme vectorielle
de la contribution
de chaque spire





Collecteur



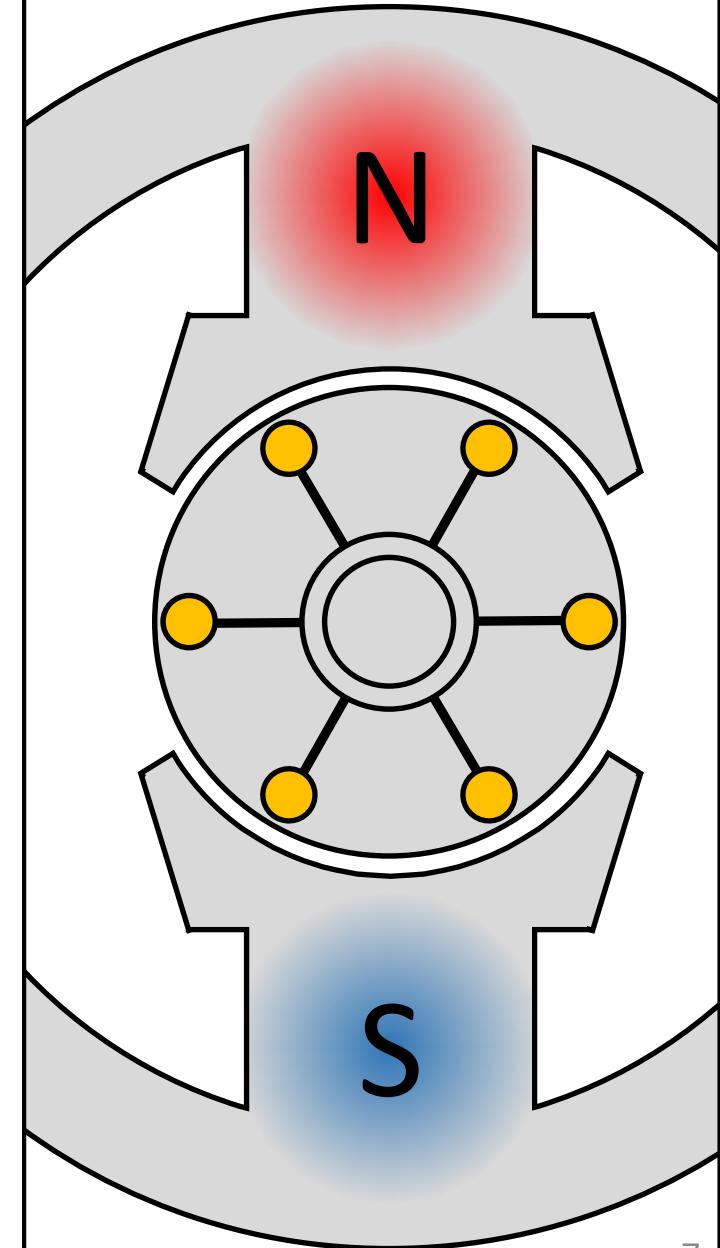
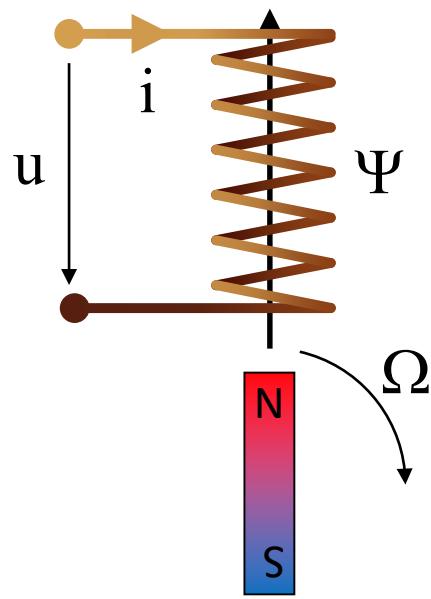
Tension induite généralisée

$$u = R i + \frac{d\Psi}{dt}$$

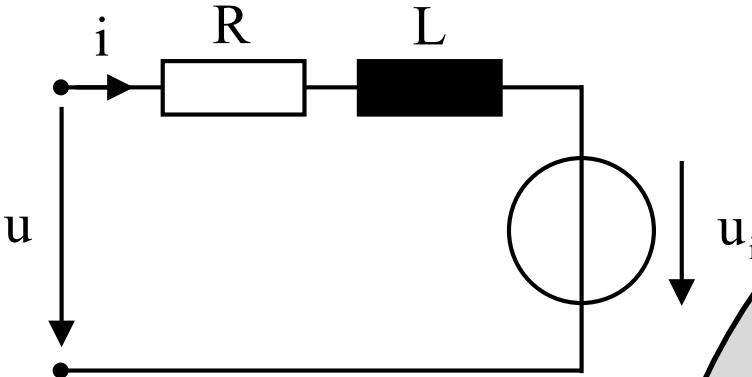
$$u = R i + L \frac{di}{dt} + k_\Phi \Omega$$

Tension induite de transformation

Tension induite de mouvement



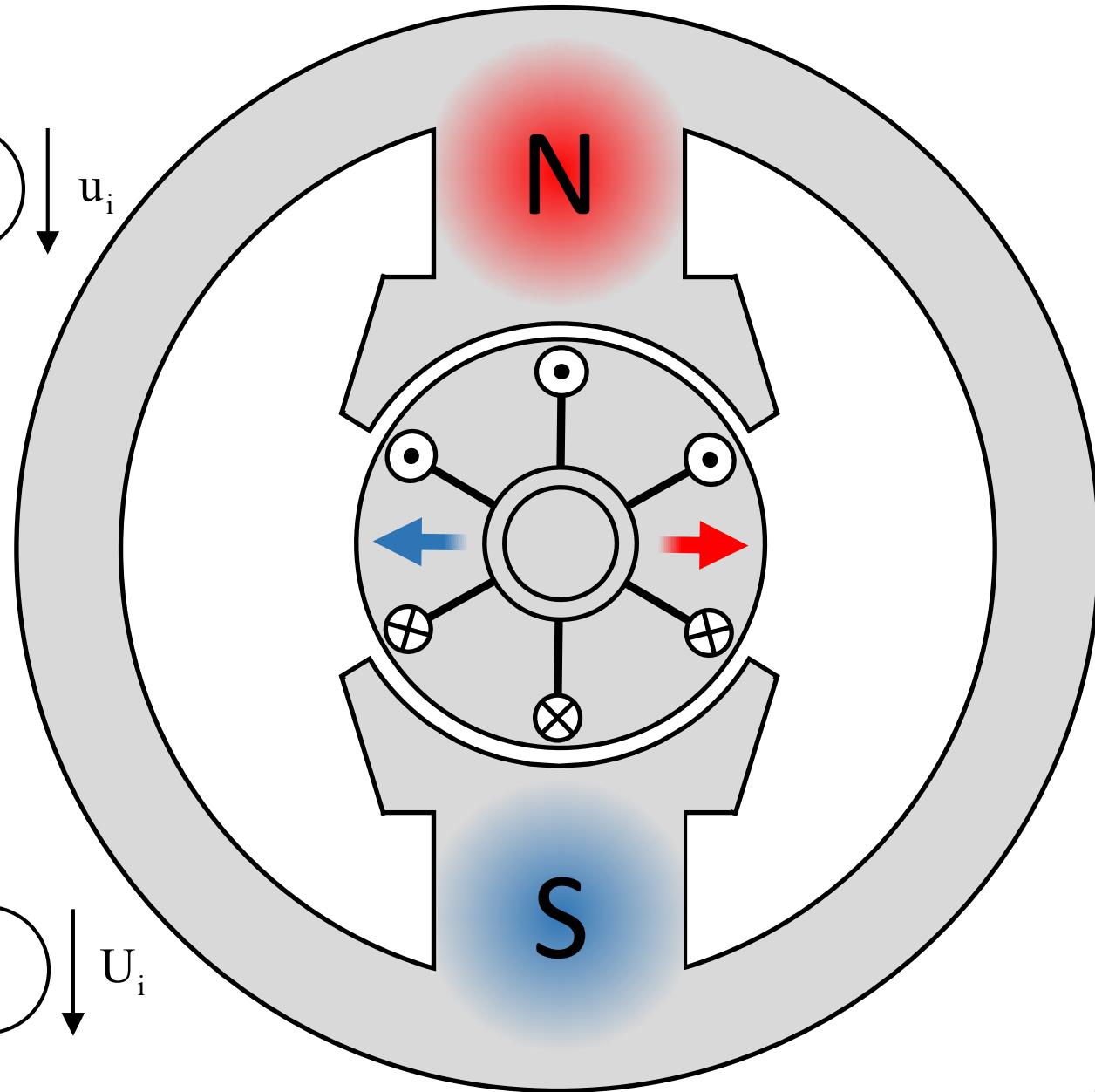
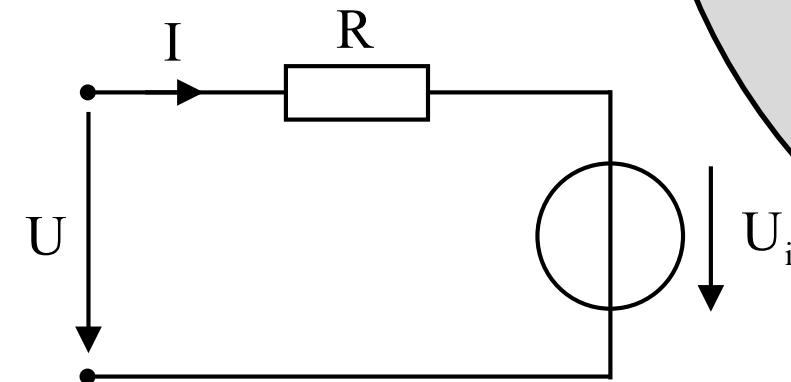
Principe de fonctionnement et schéma équivalent



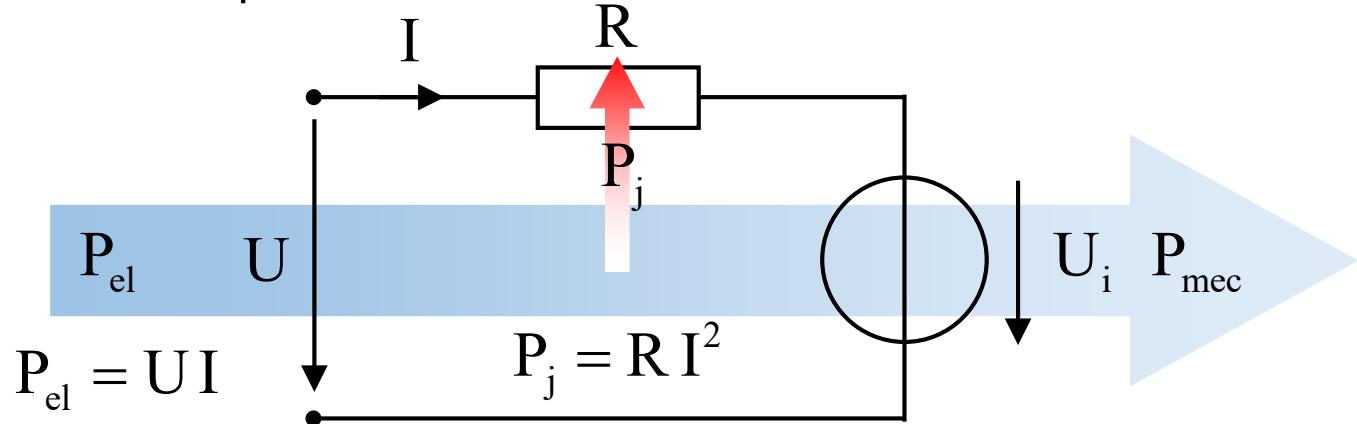
$$u = R i + L \frac{di}{dt} + u_i$$

régime permanent

$$U = R I + U_i$$



Bilan de puissance



$$P_{el} = P_j + P_{mec}$$

$$P_{mec} = \Omega T_{em} = U_i I \longrightarrow T_{em} = \frac{P_{mec}}{\Omega} = \frac{U_i I}{\Omega} = \frac{k_\Phi \Omega I}{\Omega} = k_\Phi I$$

$$U_i = k_\Phi \Omega$$

$$T_{em} = k_\Phi I$$

La tension induite est proportionnelle à la vitesse de rotation

Le couple est proportionnel au courant

Caractéristique de couple

$$U = RI + U_i$$

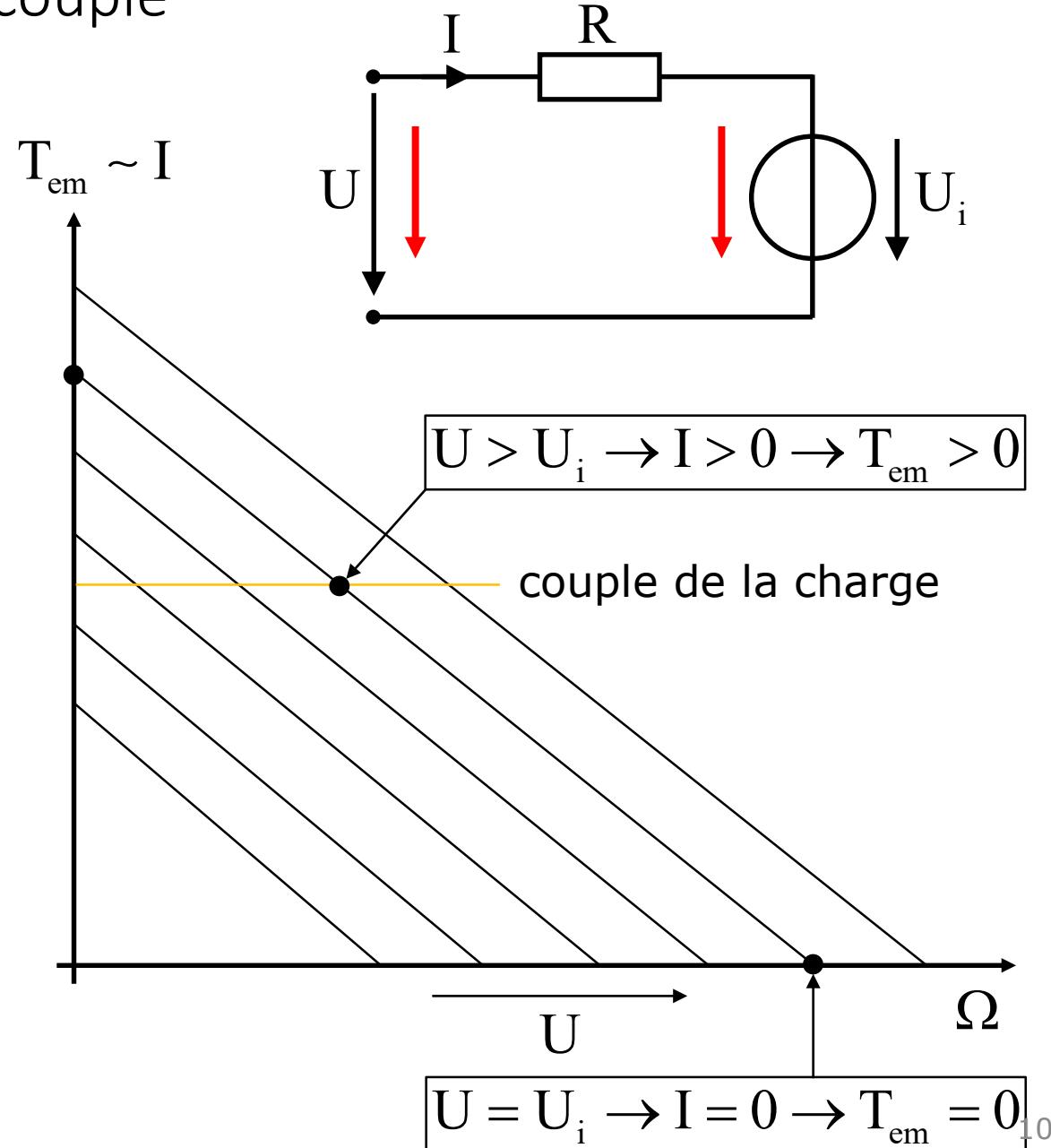
$$U_i = k_\Phi \Omega$$

$$T_{em} = k_\Phi I$$

$$U = RI + k_\Phi \Omega$$

$$I = \frac{U - k_\Phi \Omega}{R} = \frac{T_{em}}{k_\Phi}$$

$$T_{em} = k_\Phi \frac{U - k_\Phi \Omega}{R}$$



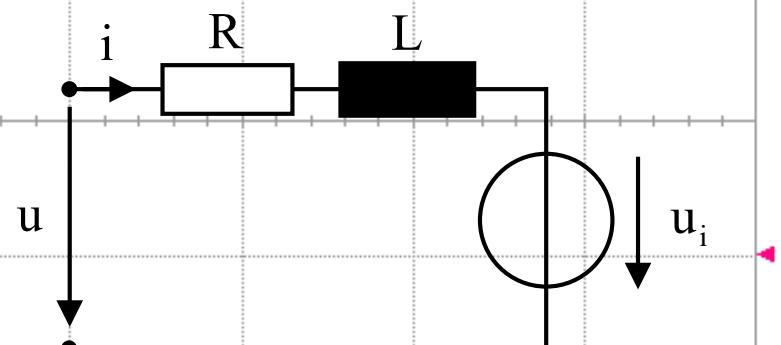
Démarrage d'un moteur à courant continu 1.8 kW

Démarrage à demi tension 100V (750 tr/min à vide)

Montée exponentielle

Décroissance avec
l'augmentation de
la vitesse

750 [tr / min]



0 [tr / min]

C2 F BwL[DC]
5.00 A/div
-15.000 A ofst

C4 F BwL[DC]
10.0 V/div
-30.000 V ofst

Timebase -198 ms
50.0 ms/div
10.0 kS

Trigger C2 DC
Stop Edge
10.00 A Positive