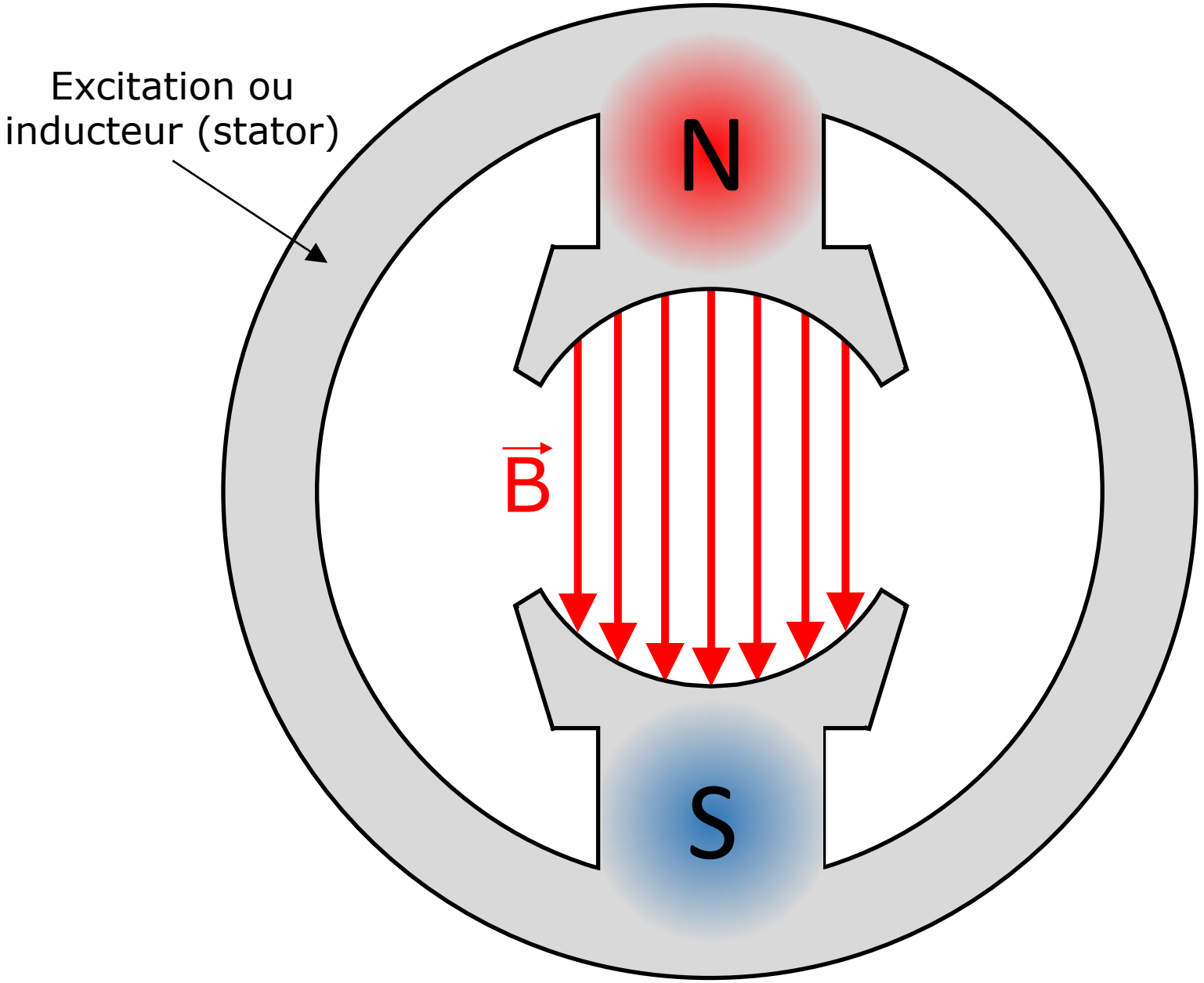
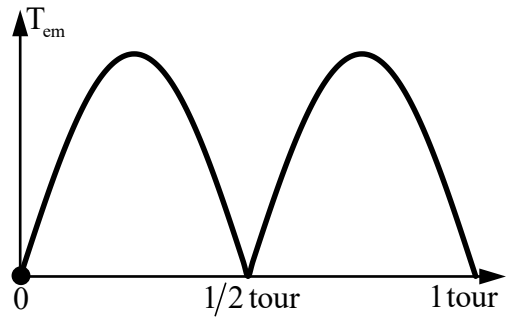
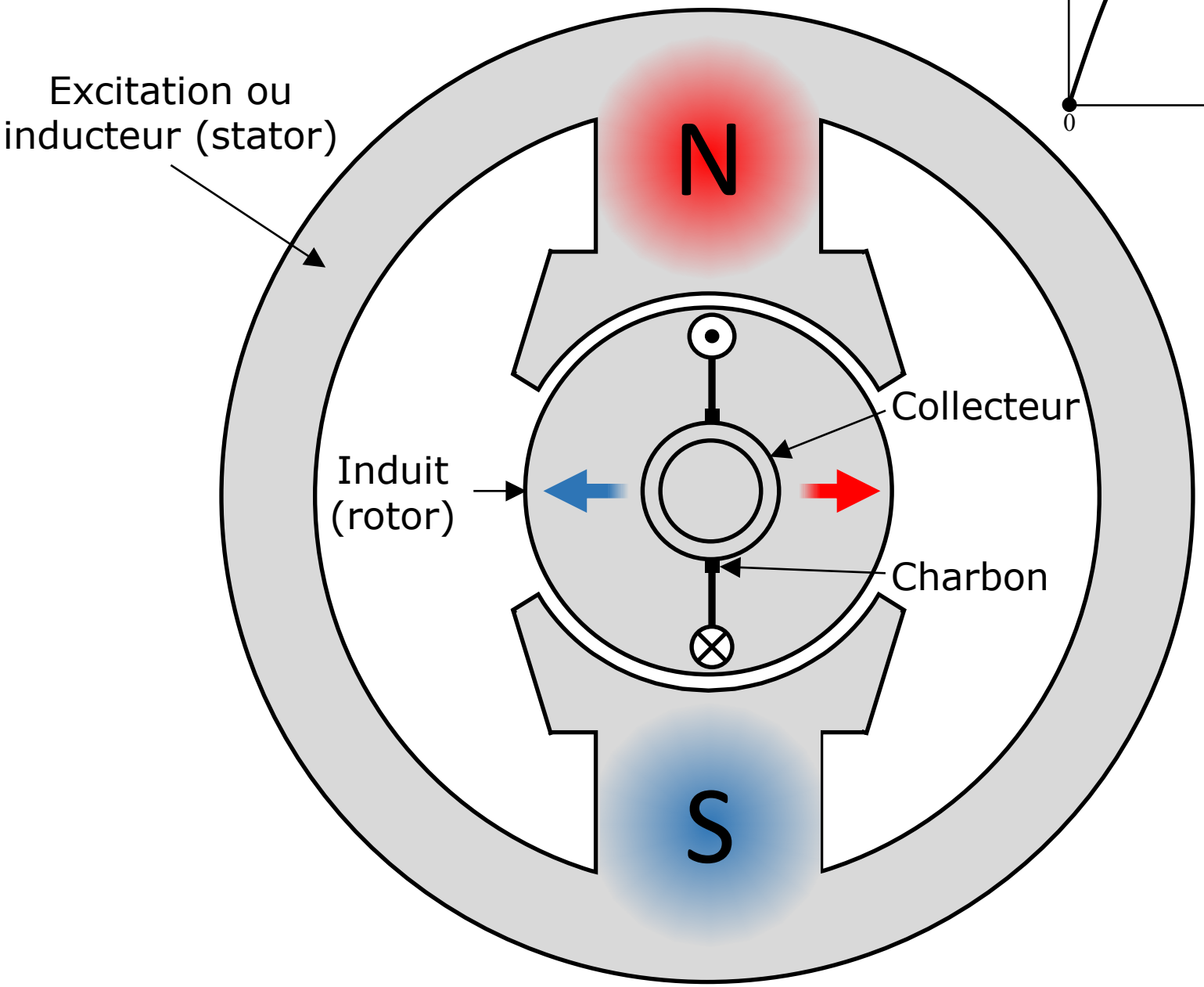
# Le moteur à courant continu
# Le moteur DC

# Principe de fonctionnement



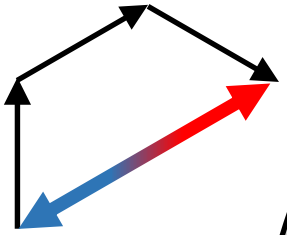
# Principe de fonctionnement

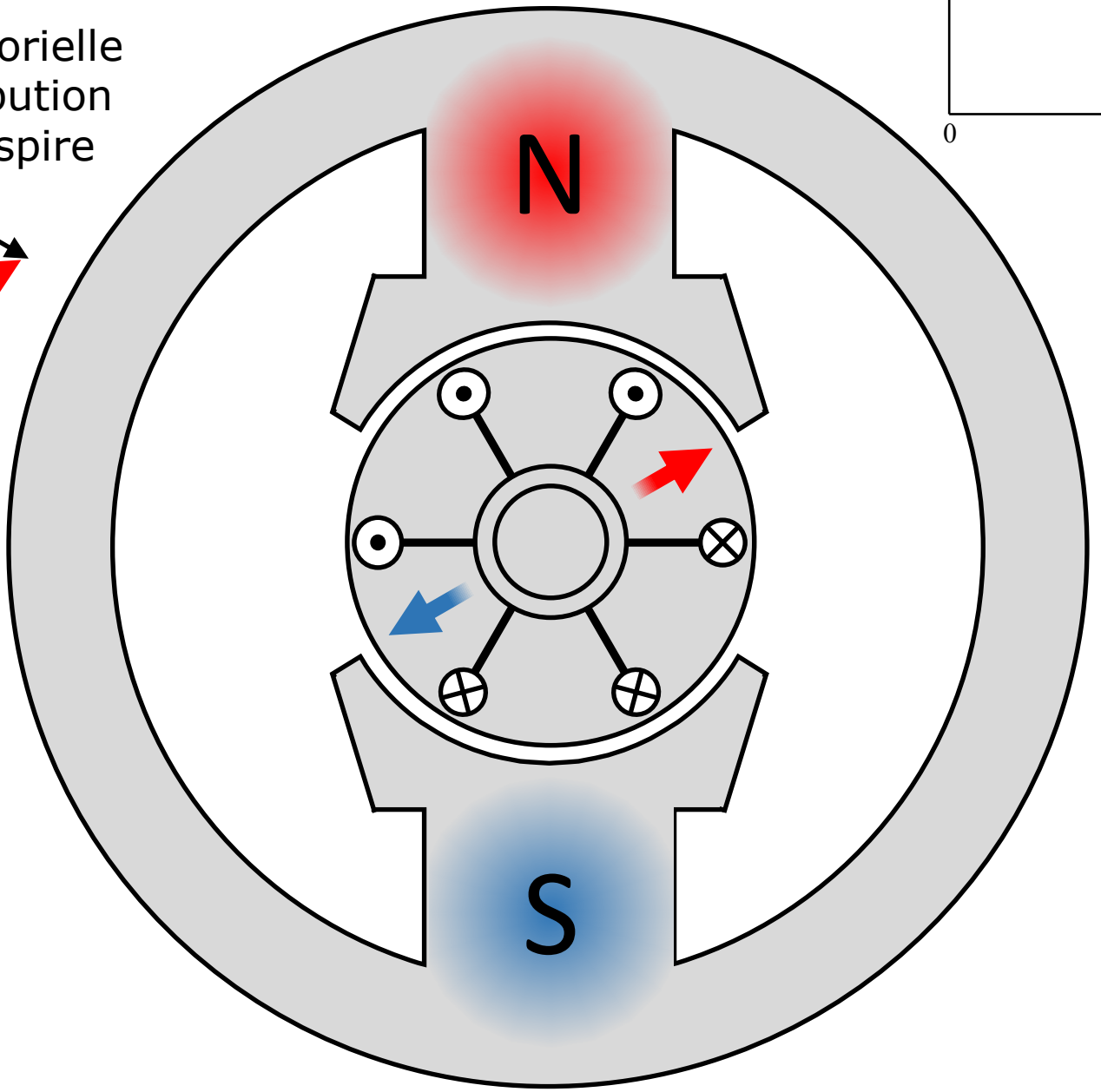


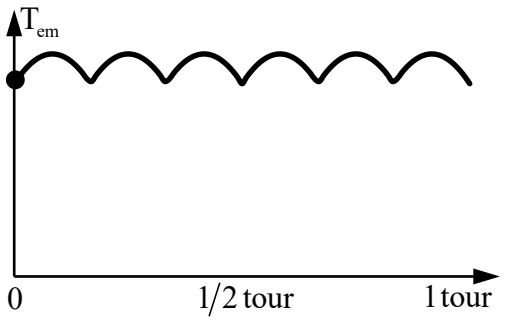



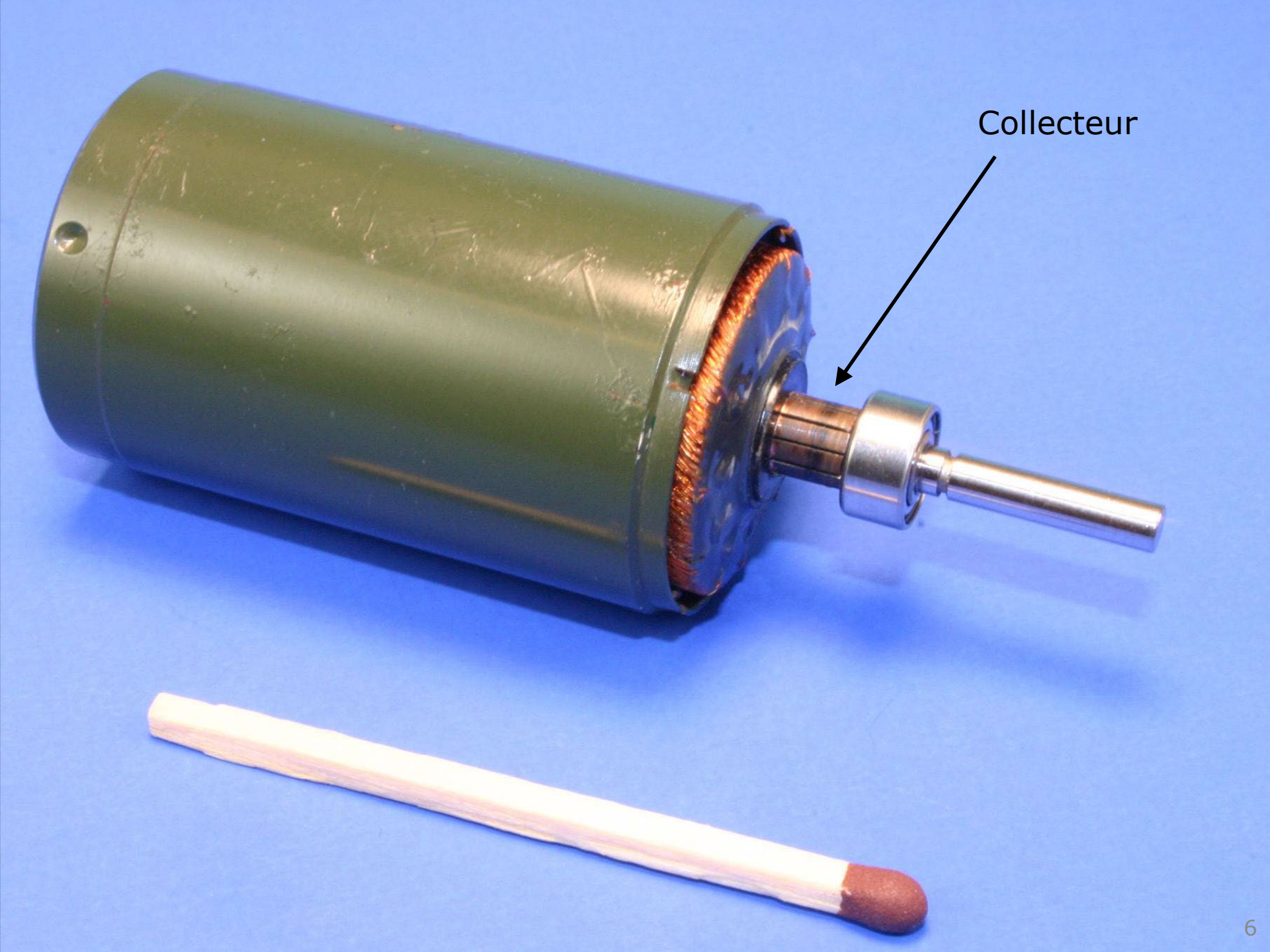
# Principe de fonctionnement

Somme vectorielle de la contribution de chaque spire





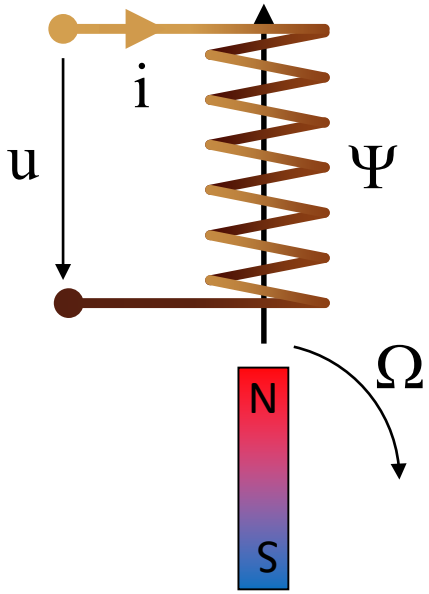



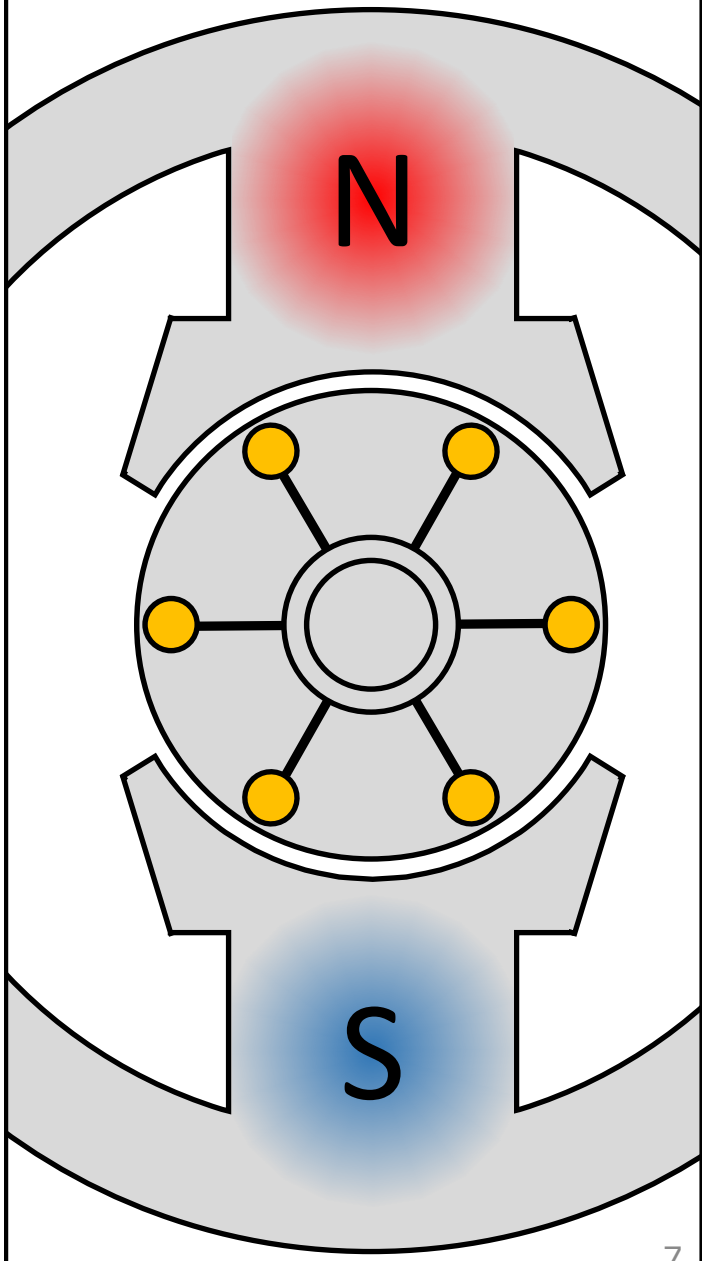

Collecteur

# Tension induite généralisée

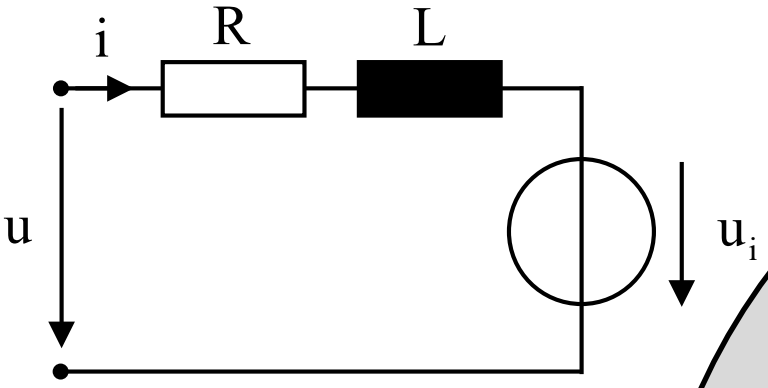
$$u = R\,i + \frac{d\Psi}{dt}$$

$$u = R\,i + \underbrace{L\frac{di}{dt}}_{\text{Tension induite de transformation}} + \underbrace{k_{\Phi}\Omega}_{\text{Tension induite de mouvement}}$$



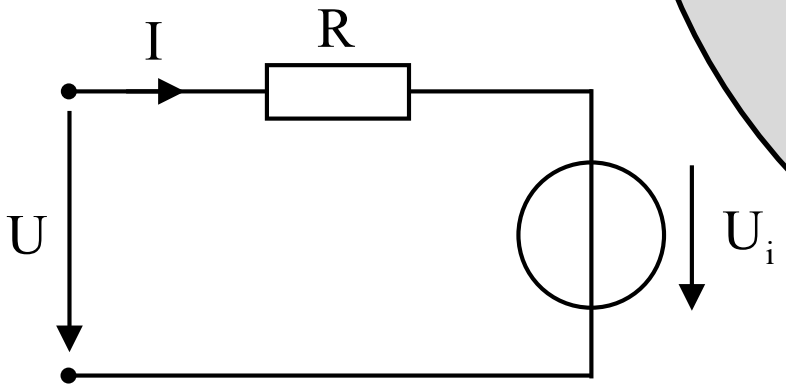
# Principe de fonctionnement et schéma équiavlent

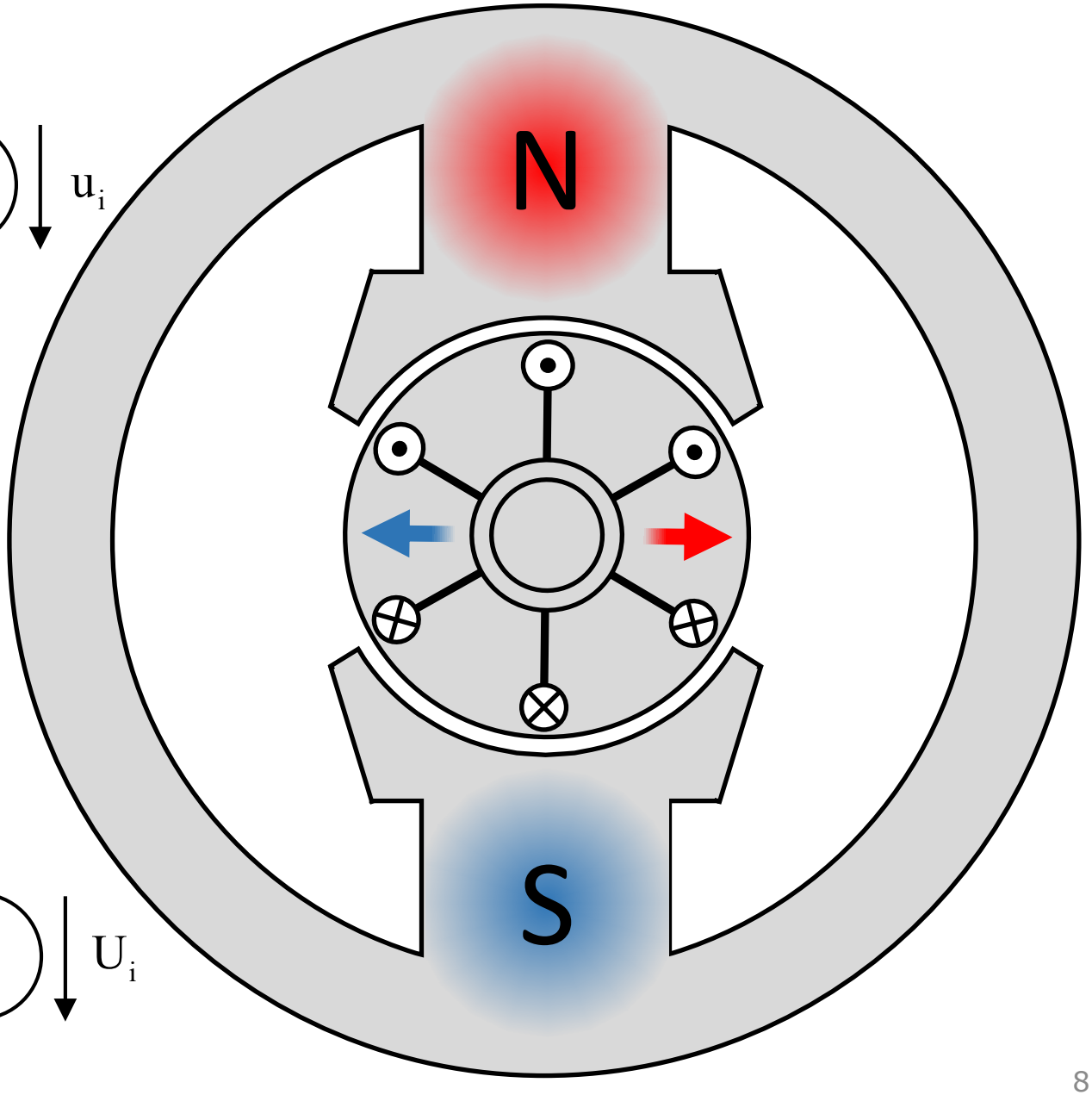



$$u = Ri + L\frac{di}{dt} + u_i$$

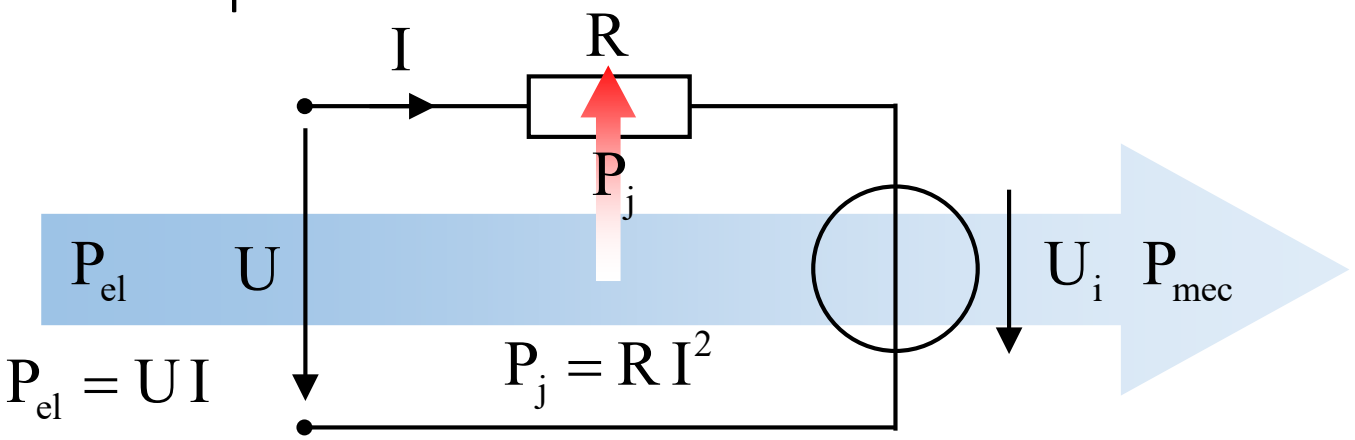
régime permanent

$$U = R\,I + U_i$$



# Bilan de puissance




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

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

$$U_i = k_\Phi \Omega \quad \overset{k_\Phi}{\longleftrightarrow} \quad T_{em} = k_\Phi I$$

La tension induite est proportionnelle à la vitesse de rotation

Le couple est proportionnel au courant

# Caractéristique de couple

$$U = R\,I + U_i$$

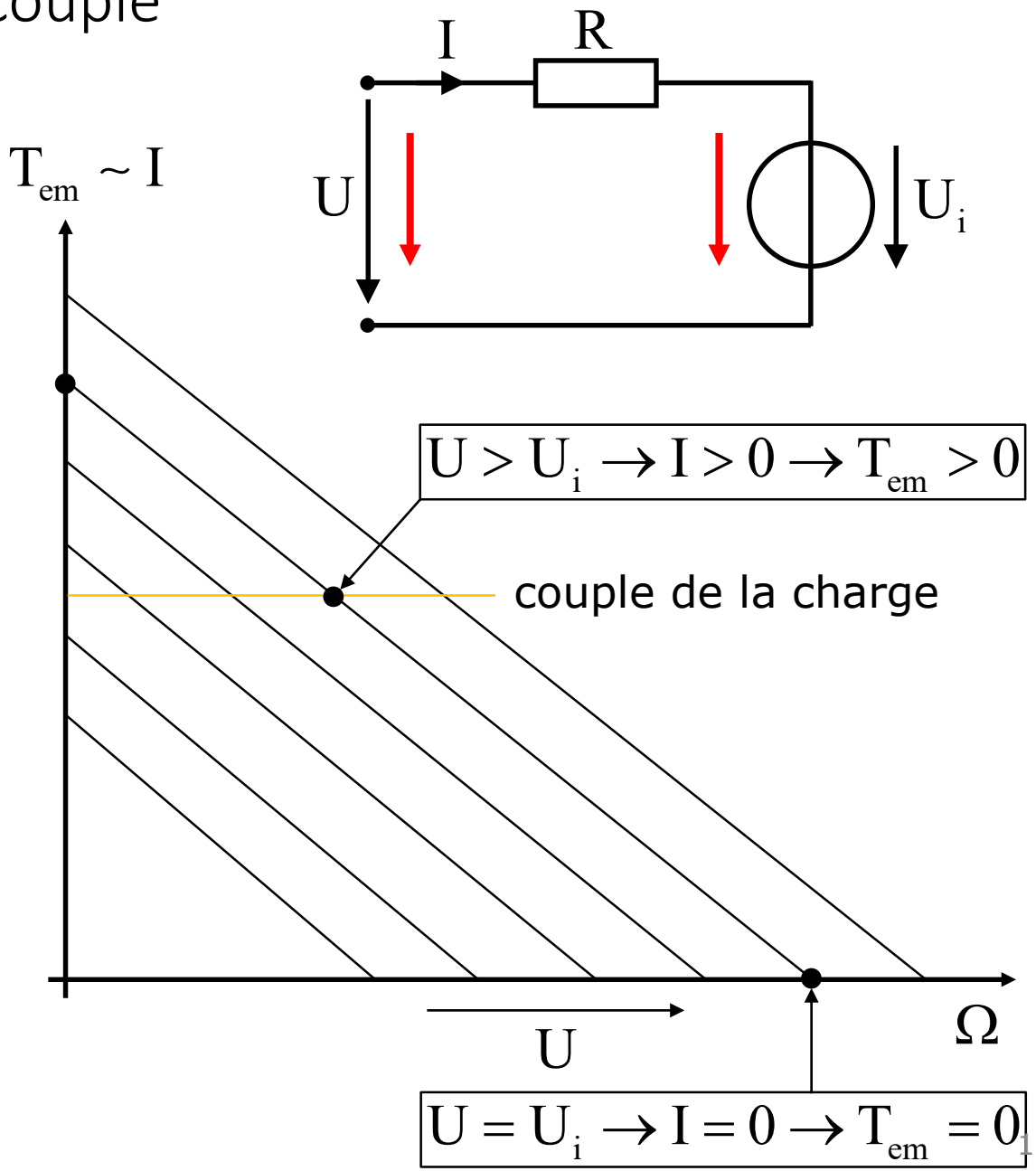
$$U_i = k_\Phi\,\Omega$$

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

$$U = R\,I + k_\Phi\Omega$$

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

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



# Démarrage d'un moteur à courant continu 1.8 kW

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