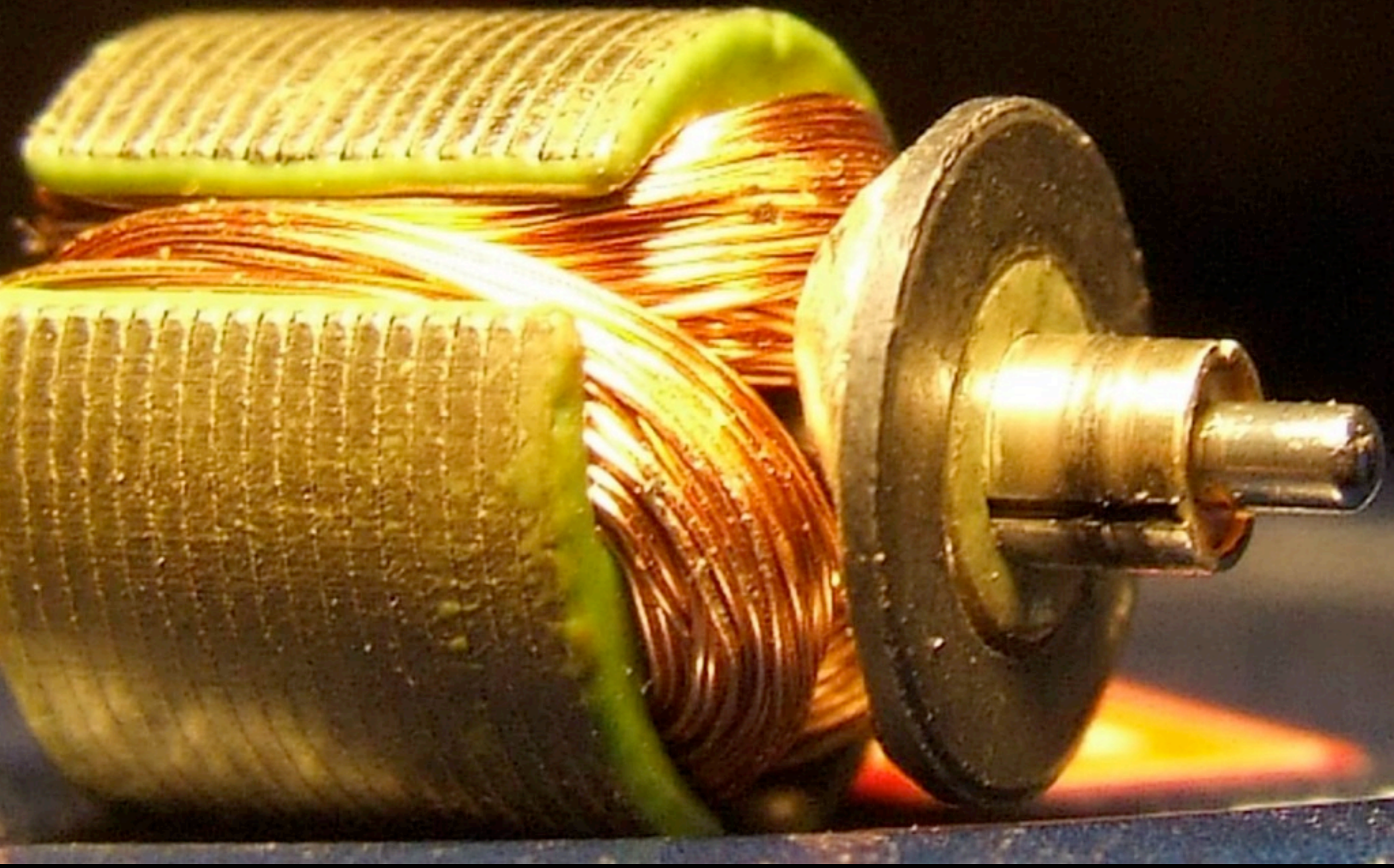
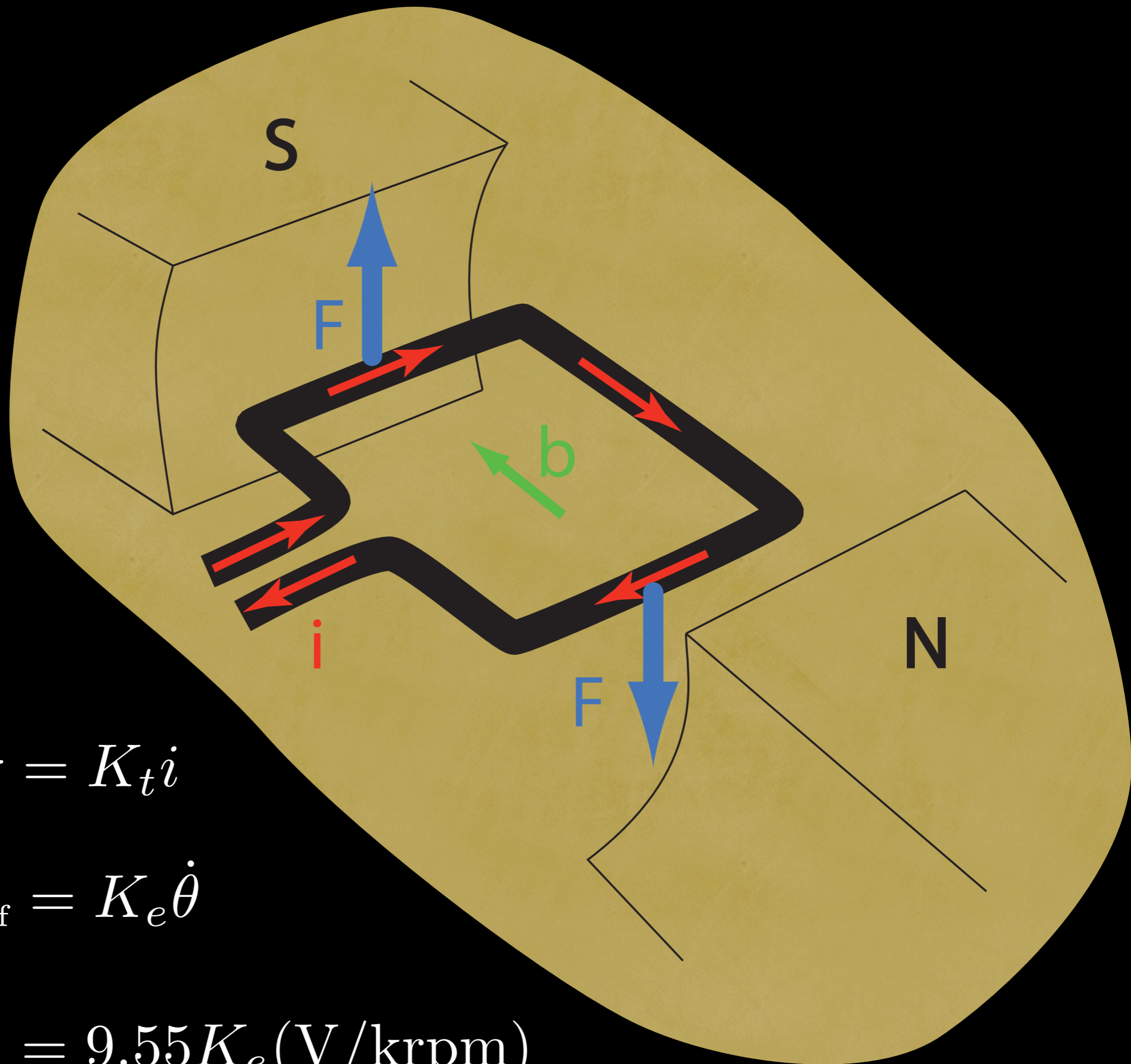


DC Brushed Motors





$$\tau = K_t i$$

$$V_{\text{emf}} = K_e \dot{\theta}$$

$$K_t (\text{mNm/A}) = 9.55 K_e (\text{V/krpm})$$

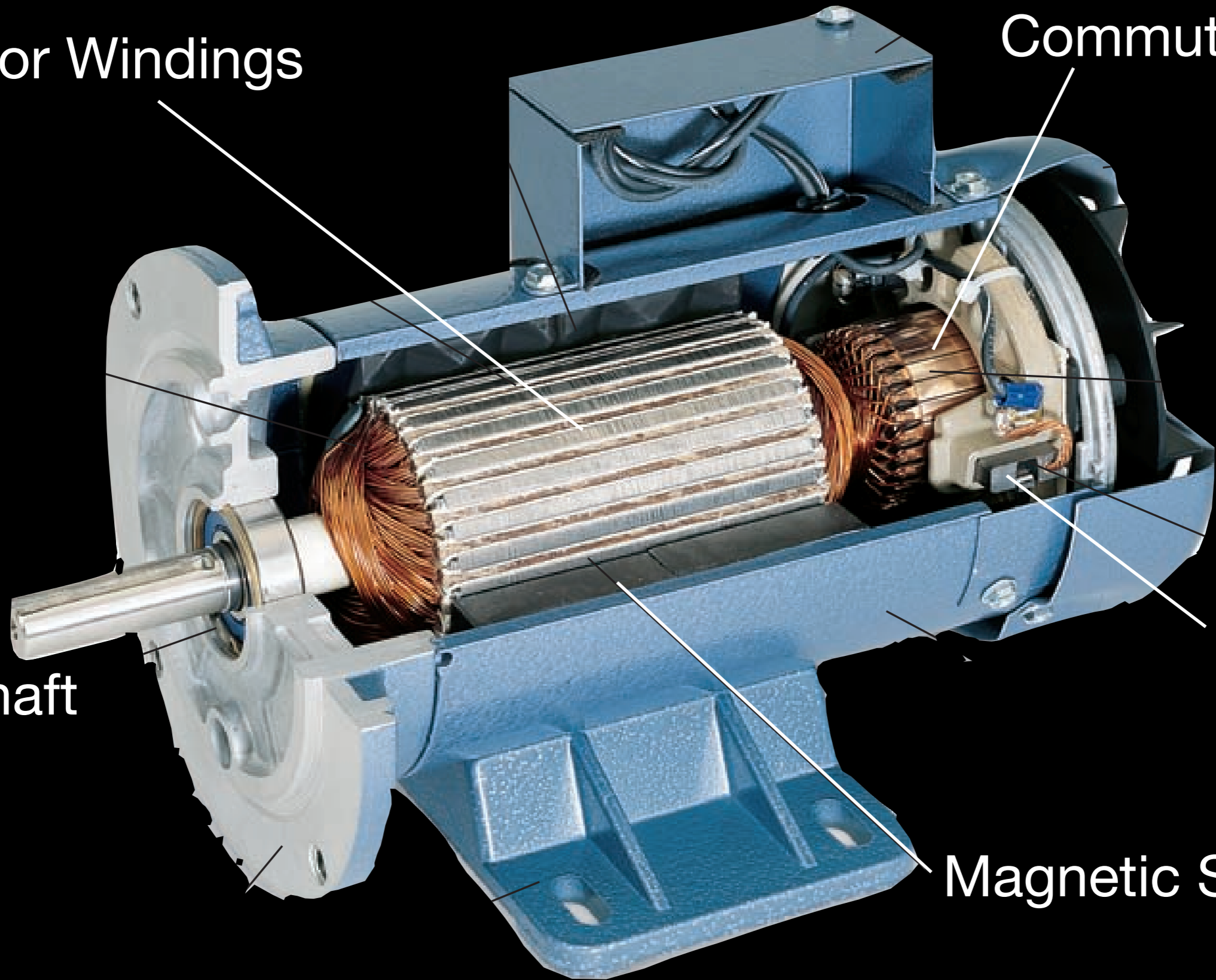
Rotor Windings

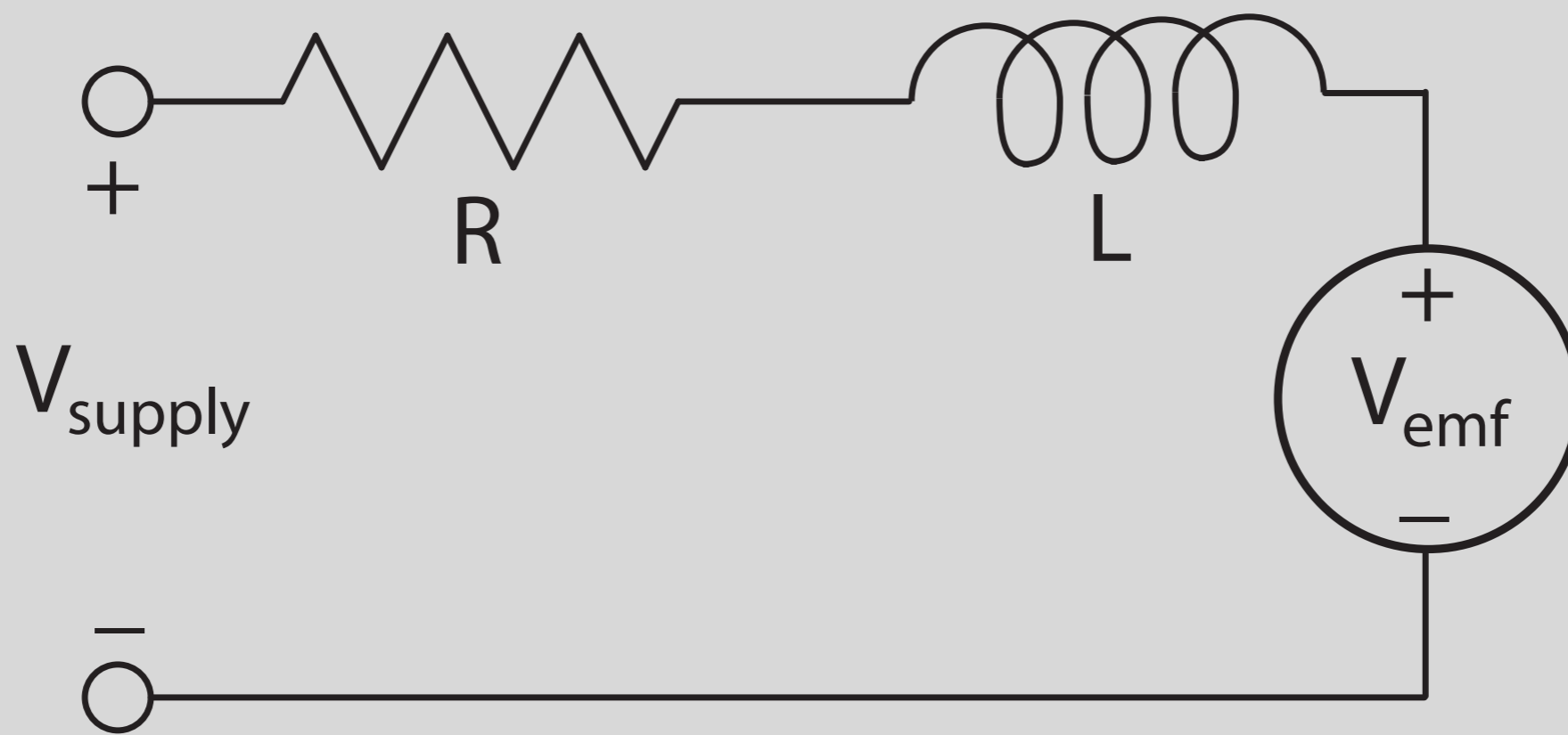
Commutator

Shaft

Brushes

Magnetic Stator



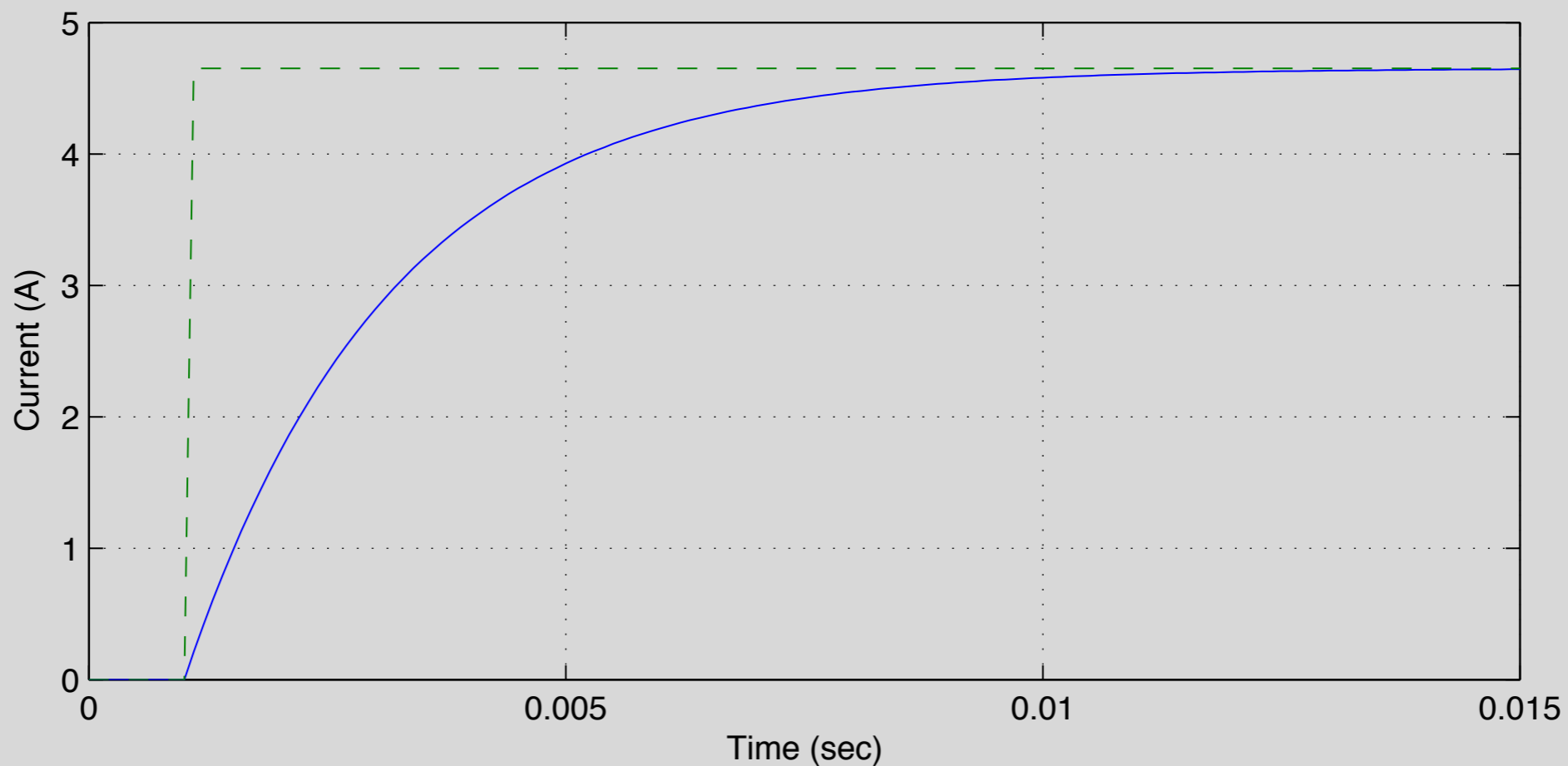


$$V_{\text{supply}} = Ri + L \frac{di}{dt} + V_{\text{emf}}$$

\uparrow
 $K_e \dot{\theta}$

Inductive Effects: Transient Behavior

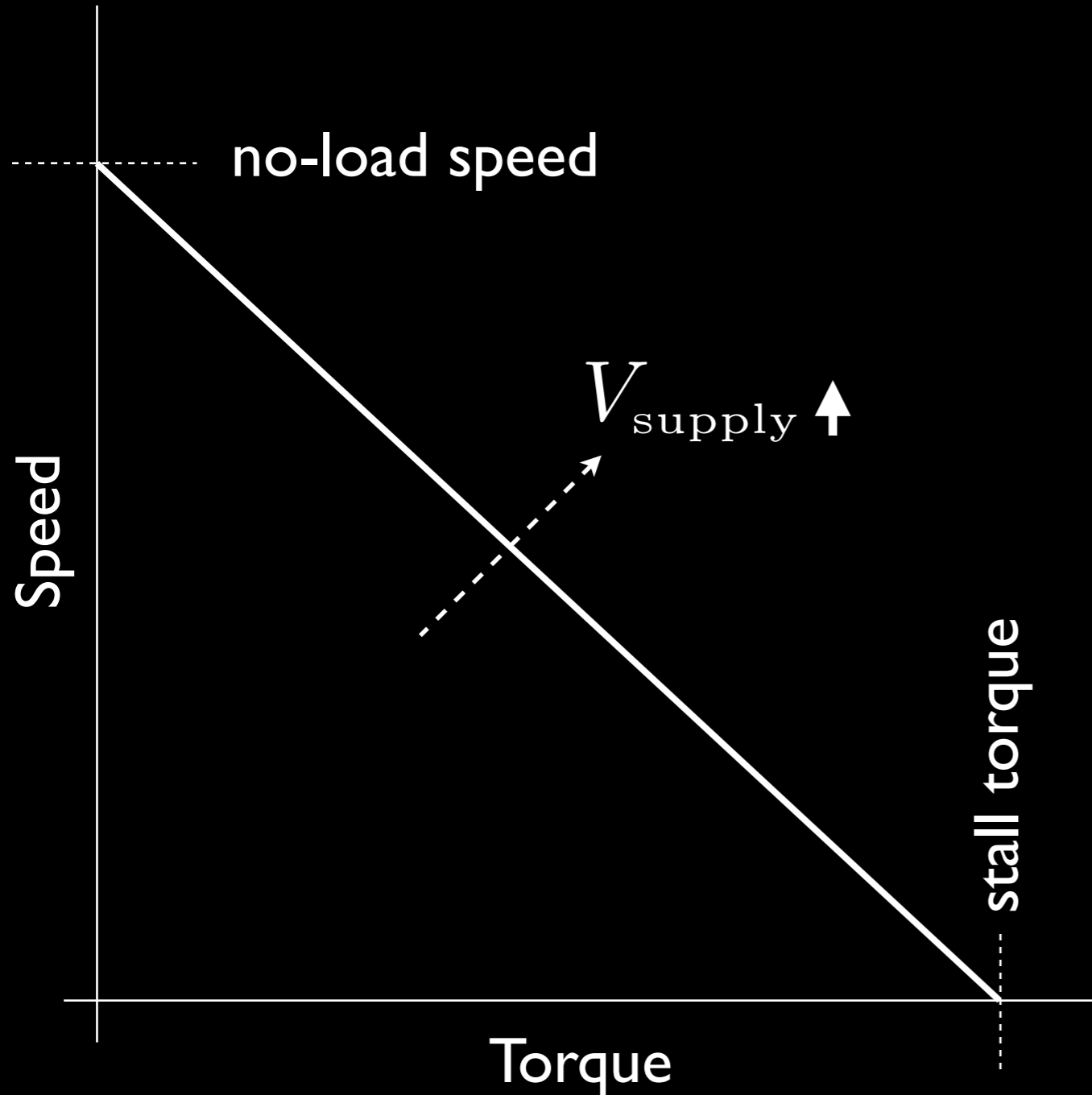
$$V_{\text{supply}} = Ri + L \frac{di}{dt} \quad i = \frac{V_{\text{supply}}}{R} \left(1 - e^{-tR/L} \right)$$

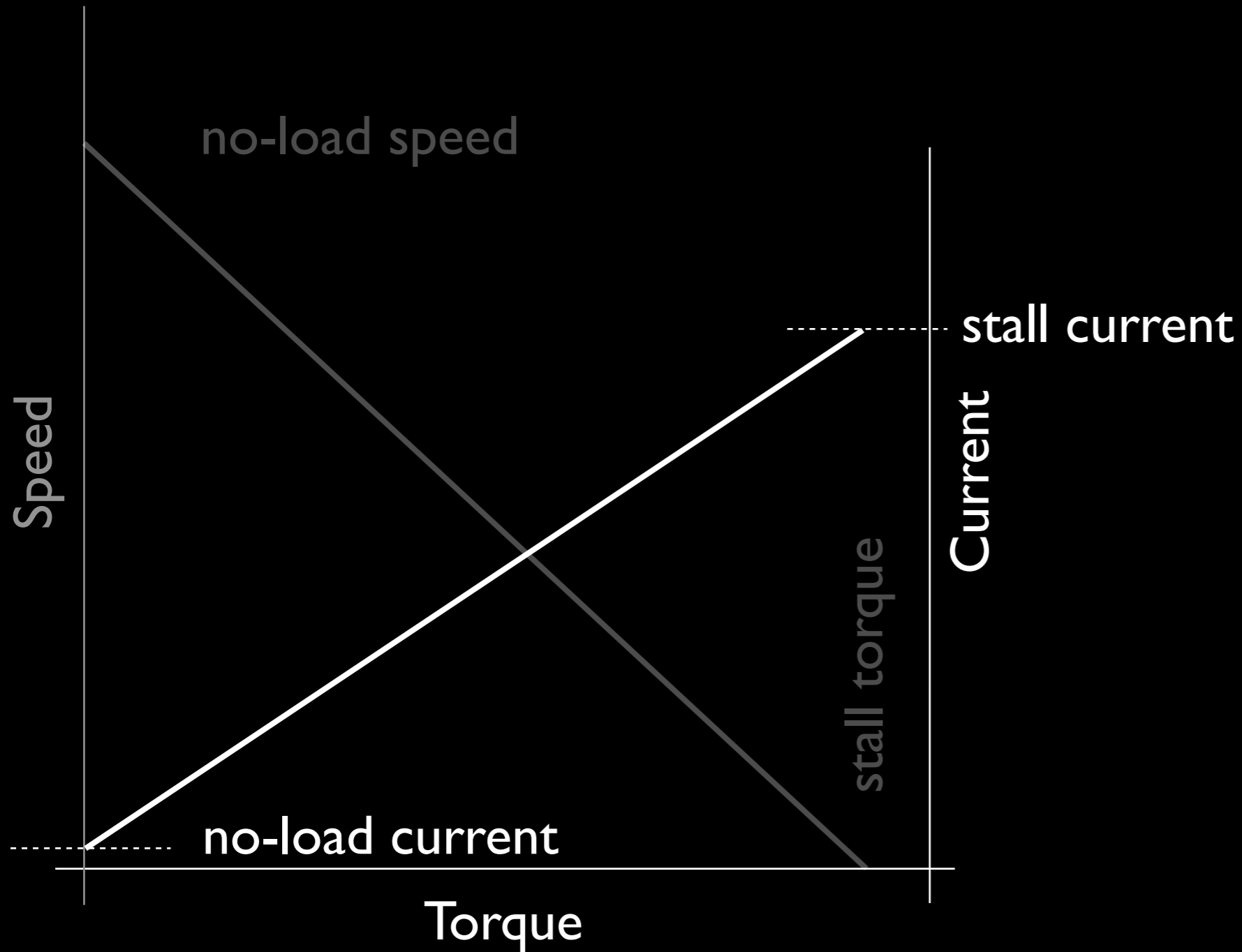


$$\dot{\theta} = \frac{V_{\text{supply}}}{K_e} - \tau \frac{R}{K_e K_t}$$

or

$$\dot{\theta} = \dot{\theta}_{nl} - \tau R_m$$

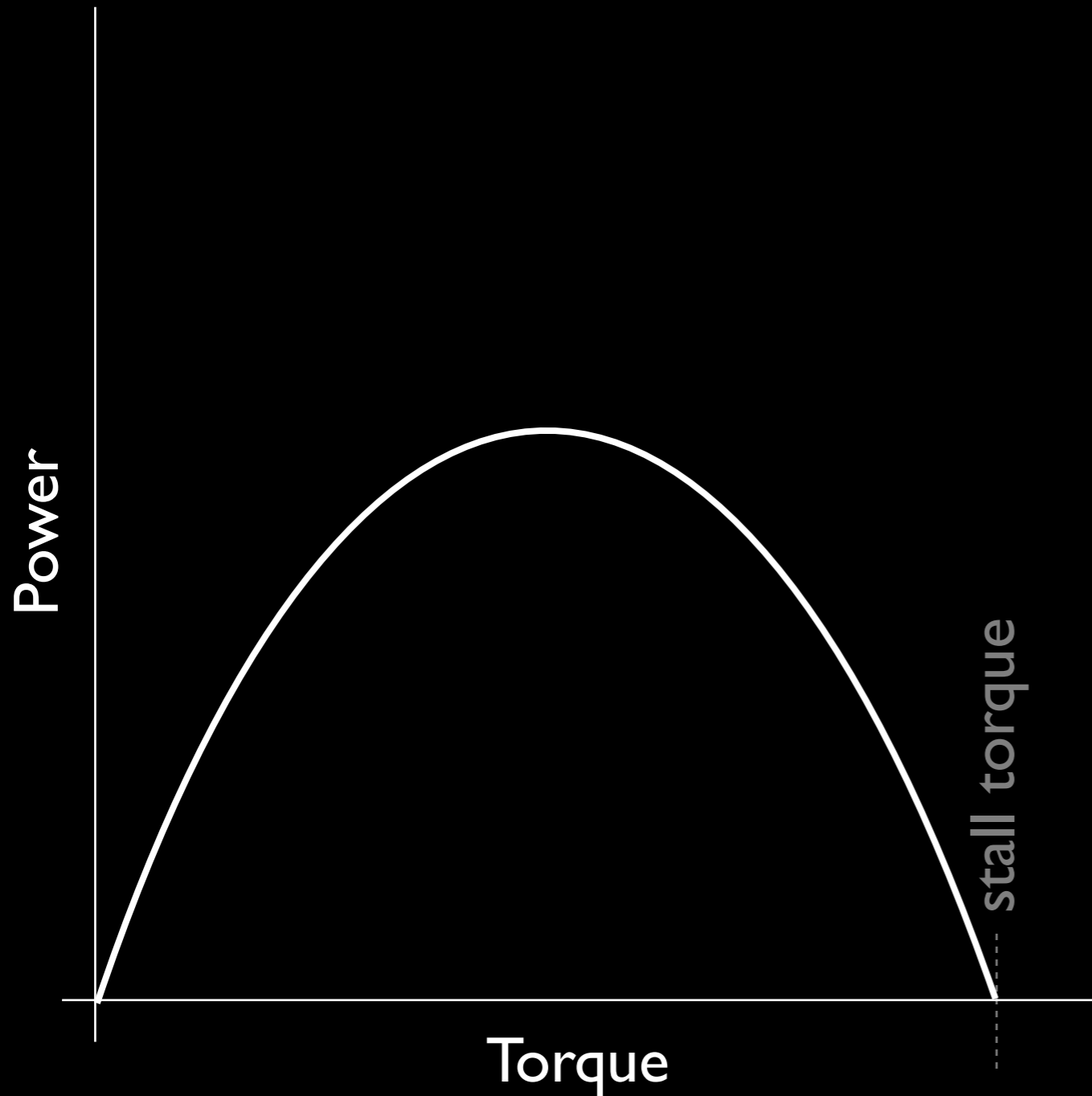


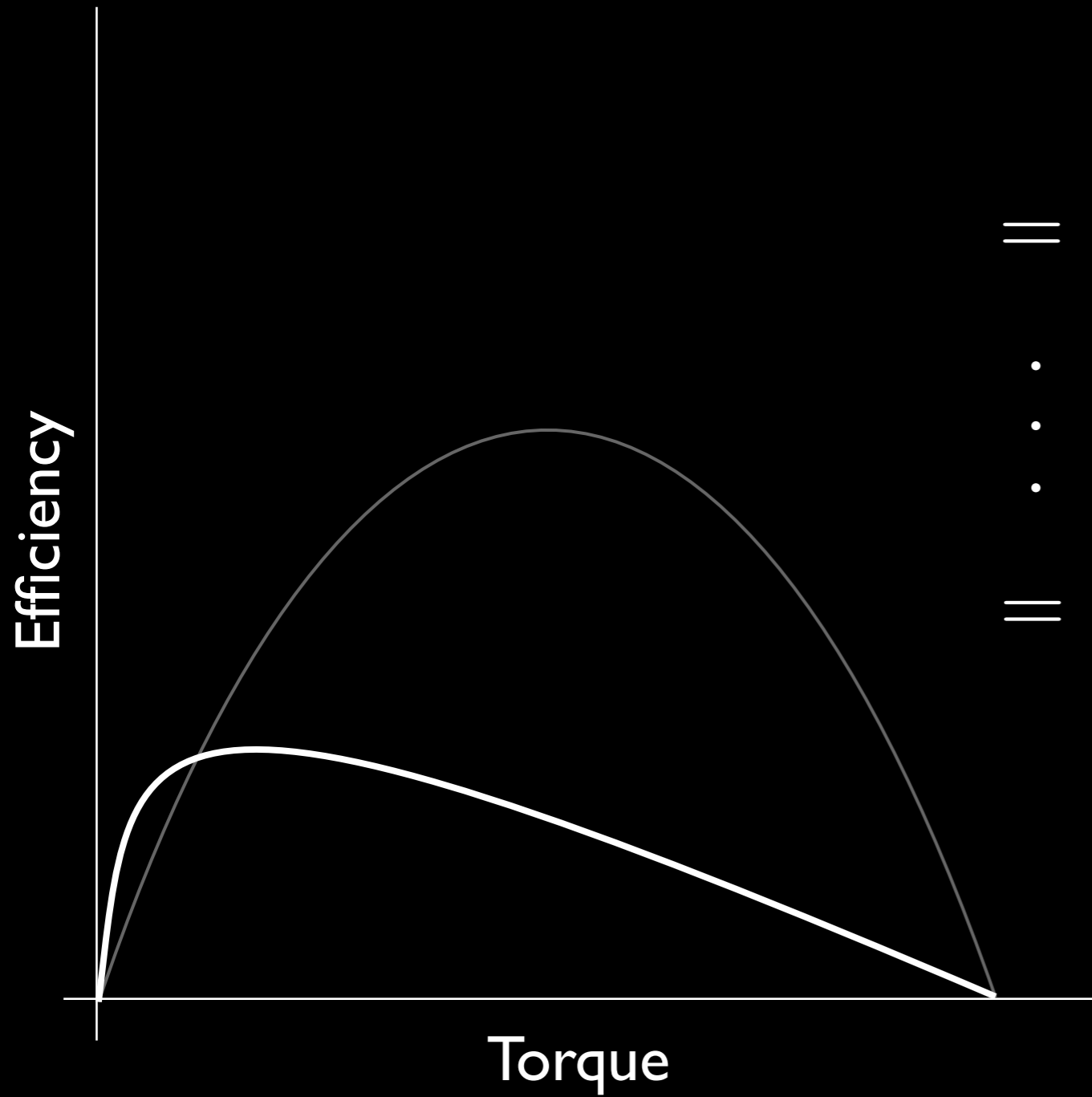


$$\tau = K_t i$$

$$P_m = \tau \dot{\theta}$$

$$= \tau \dot{\theta}_{nl} - \tau^2 R_m$$





$$\eta = \frac{P_m}{P_e}$$

$$= \frac{\tau \dot{\theta}}{V_i}$$

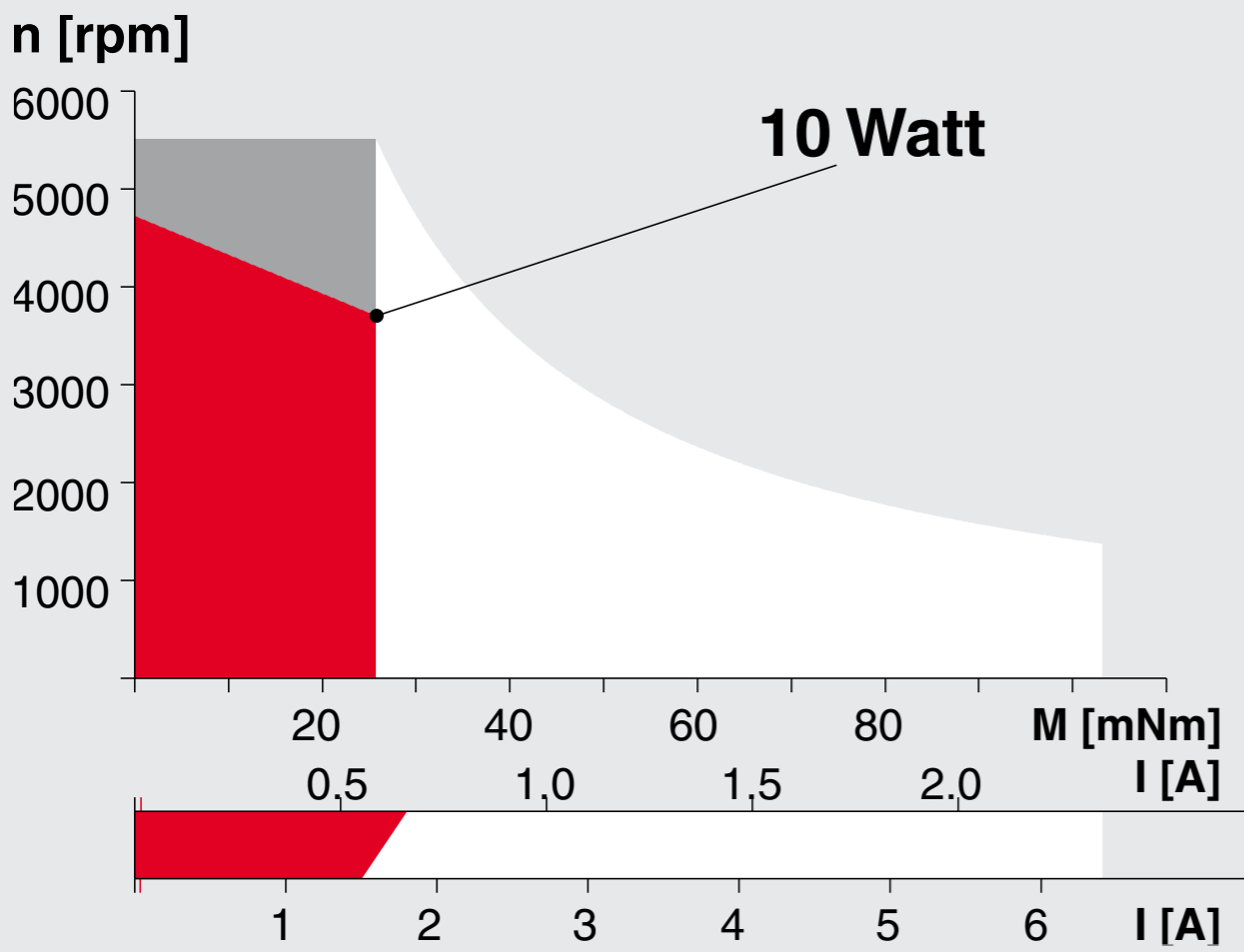
⋮

$$= \left(1 - \frac{\tau_{\text{friction}}}{\tau}\right) \left(1 - \frac{\tau}{\tau_{\text{stall}}}\right)$$

Operating Range

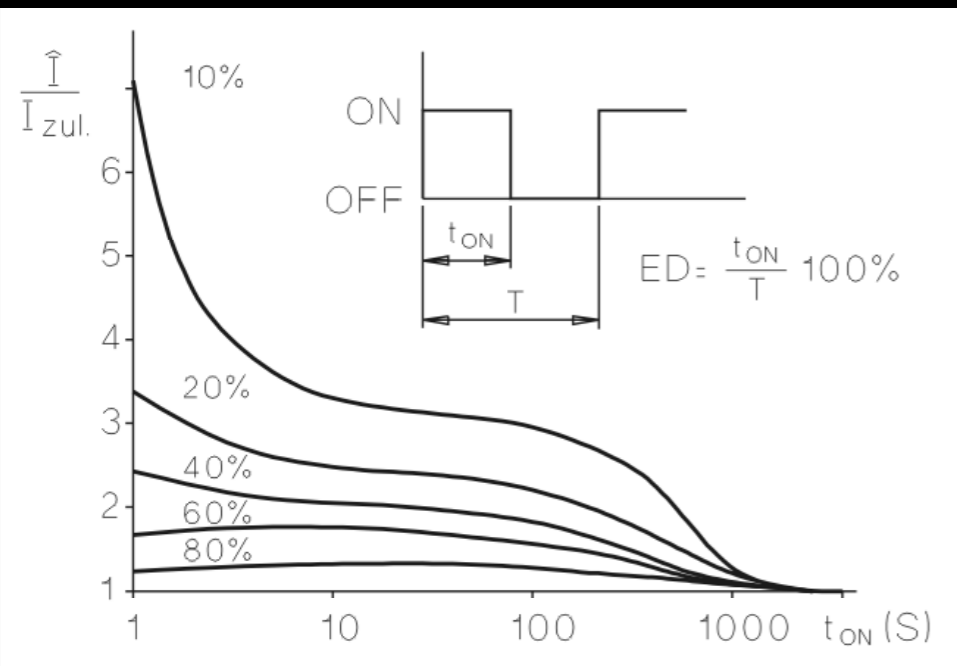
Comments

Details on page 49



- Recommended operating range**
- Continuous operation**
In observation of above listed thermal resistances (lines 19 and 20) the maximum permissible rotor temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).

- 118746** Motor with high resistance winding
- 118742** Motor with low resistance winding



Faulhaber encoded right-angle DC gearmotor



nominal operating voltage

6 V

gearhead

141:1

shaft diameter

3 mm "D"

