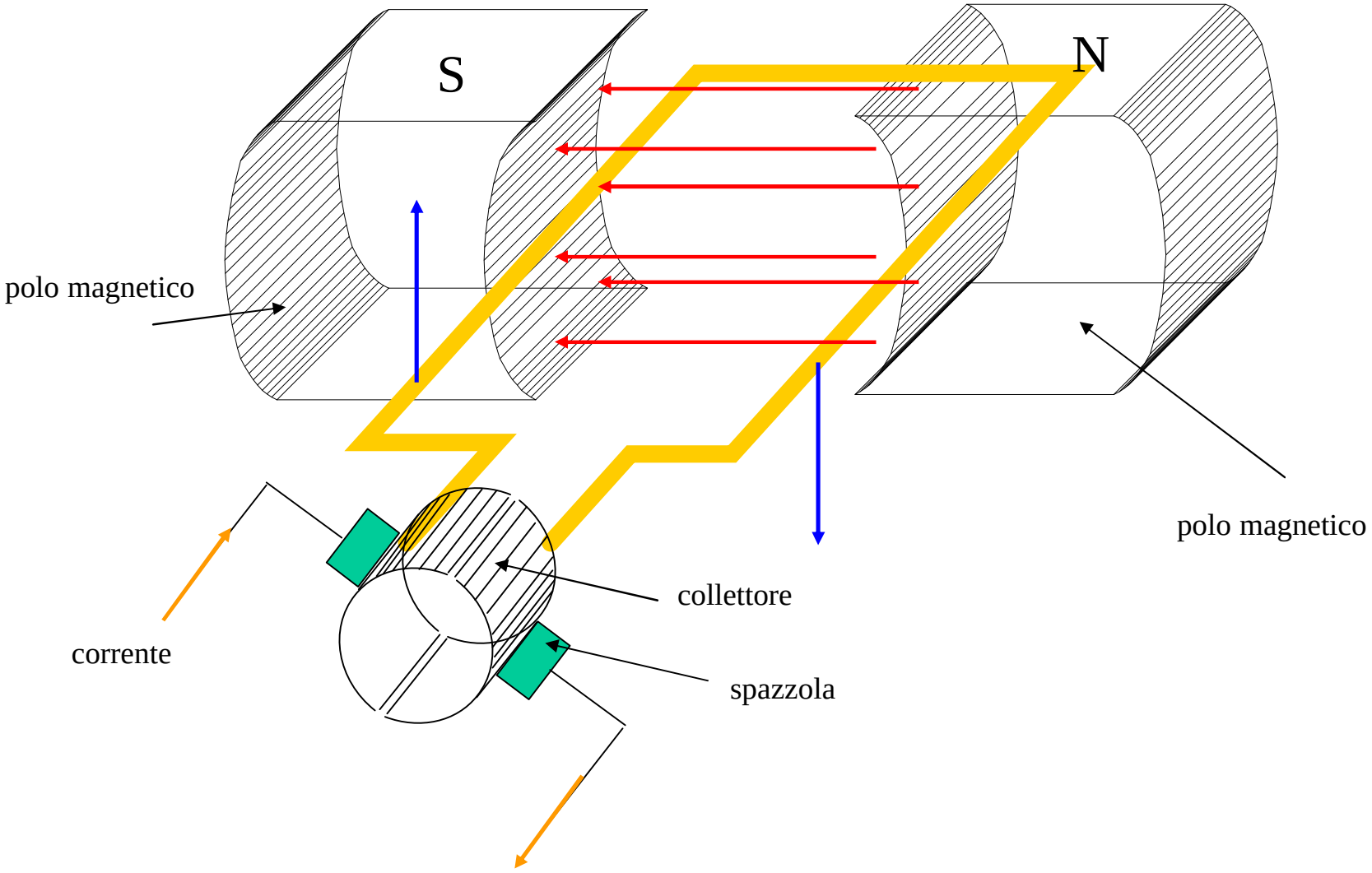
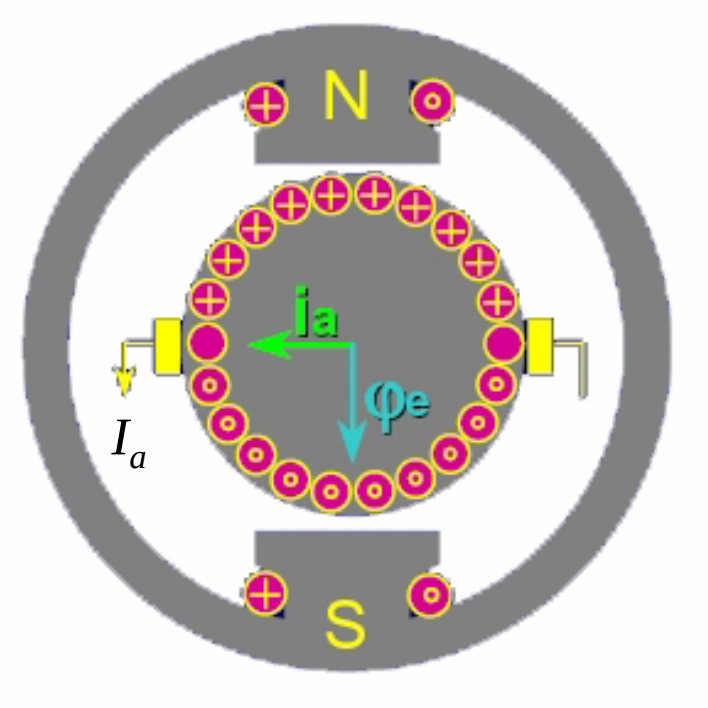
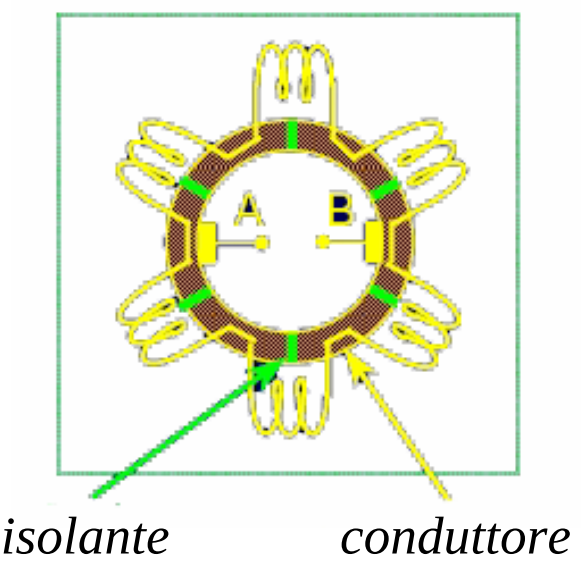
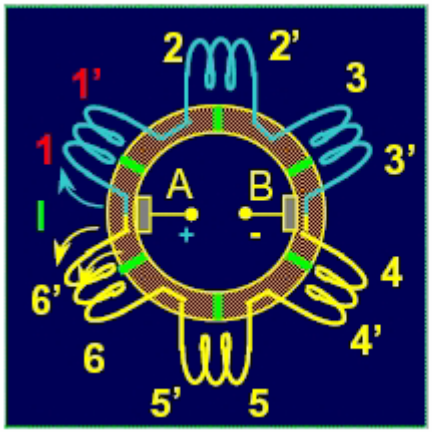

S
N
polo magnetico
polo magnetico
collettore
corrente
spazzola



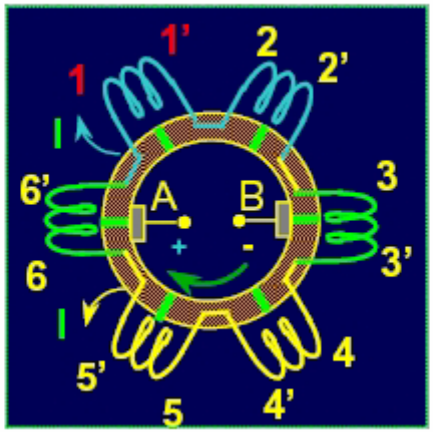
ROTORE



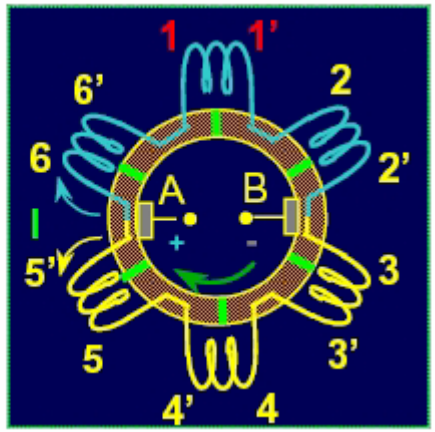
Collegamenti degli avvolgimenti di rotore
Azione delle spazzole e del collettore



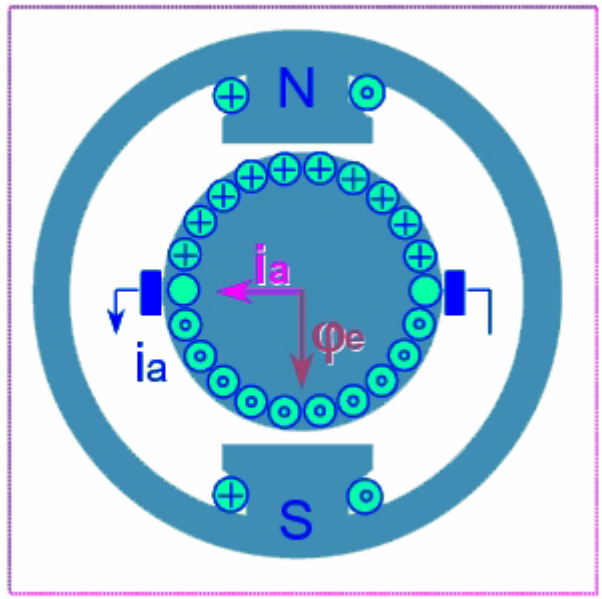
0°



30°

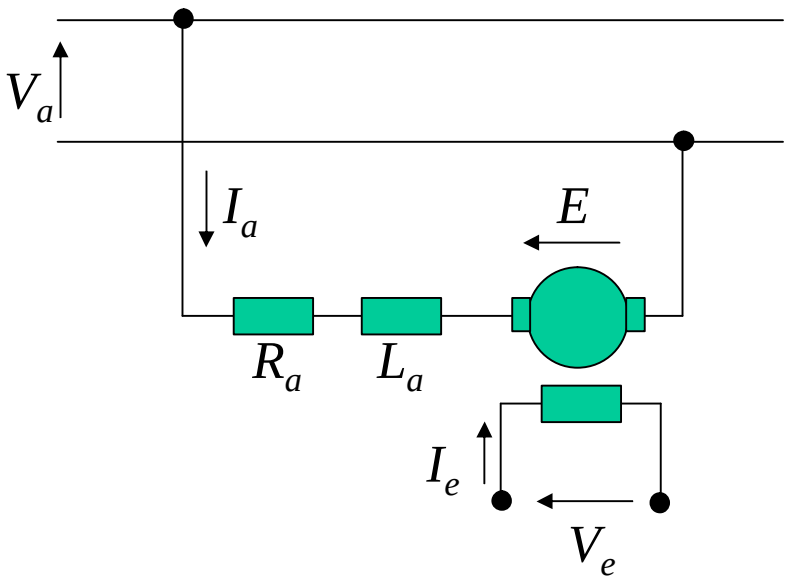


60°



Caratteristiche strutturali derivanti dalla costruzione

- direzione di I_a costante
  - collettore/spazzole
- direzione di I_e costante
  - per costruzione
- valore di $I_a \Rightarrow$ variabile
- valore di φ_e
  - ecc. separ. $\Rightarrow$ variabile
  - magn. perm. $\Rightarrow$ costante

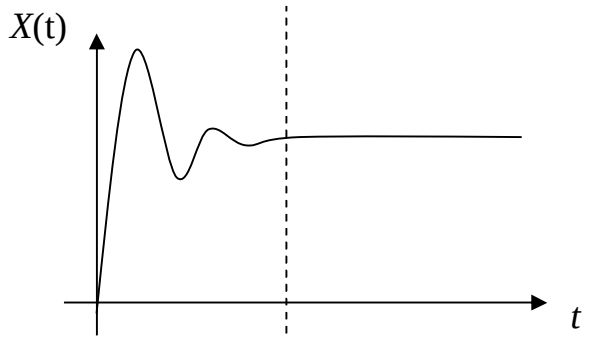


$$\begin{cases} V_a = R_a I_a + L_a \dfrac{dI_a}{dt} + E \\ V_e = R_e I_e + N_e \dfrac{d\Phi_e}{dt} \\ J \dfrac{dw}{dt} = M - M_L \end{cases}$$

$$E = k\Phi w$$

$$M = k\Phi I_a$$

$$\Phi = \Phi_e - \Phi_{s,e}$$

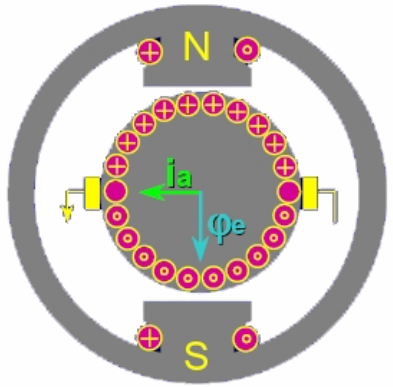


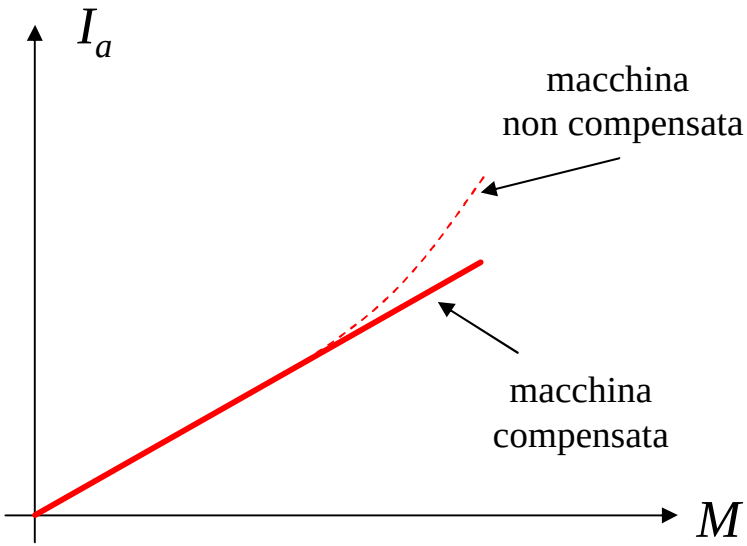
$$\begin{cases} V_a = R_a I_a + L_a \dfrac{dI_a}{dt} + E \\ V_e = R_e I_e + N_e \dfrac{d\Phi_e}{dt} \\ J \dfrac{dw}{dt} = M - M_L \end{cases}$$

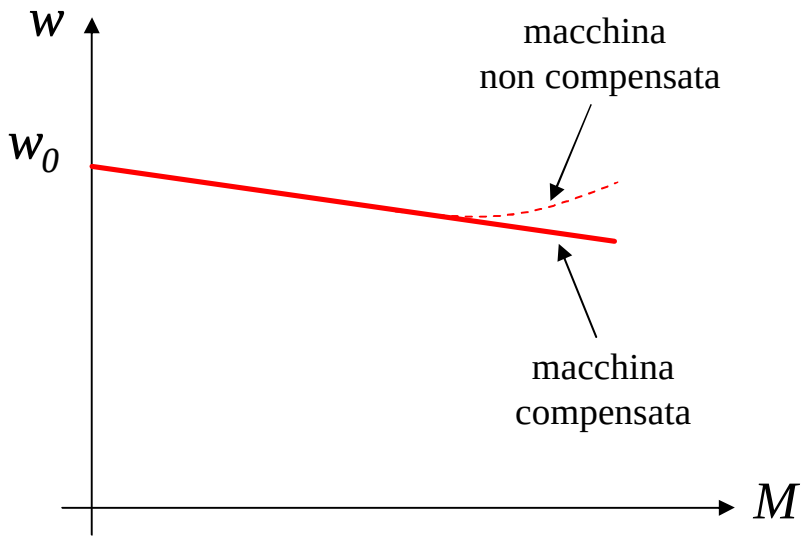
$$\begin{cases} V_a = R_a I_a + E \\ M = M_L \\ E = k\Phi w \\ M = k\Phi I_a \end{cases}$$

$$V_a = R_a I_a + E$$
$$M = M_L$$
$$E = k\Phi w$$
$$M = k\Phi I_a$$

$$w = \frac{V_a}{k\Phi} - \frac{R_a}{(k\Phi)^2} M$$







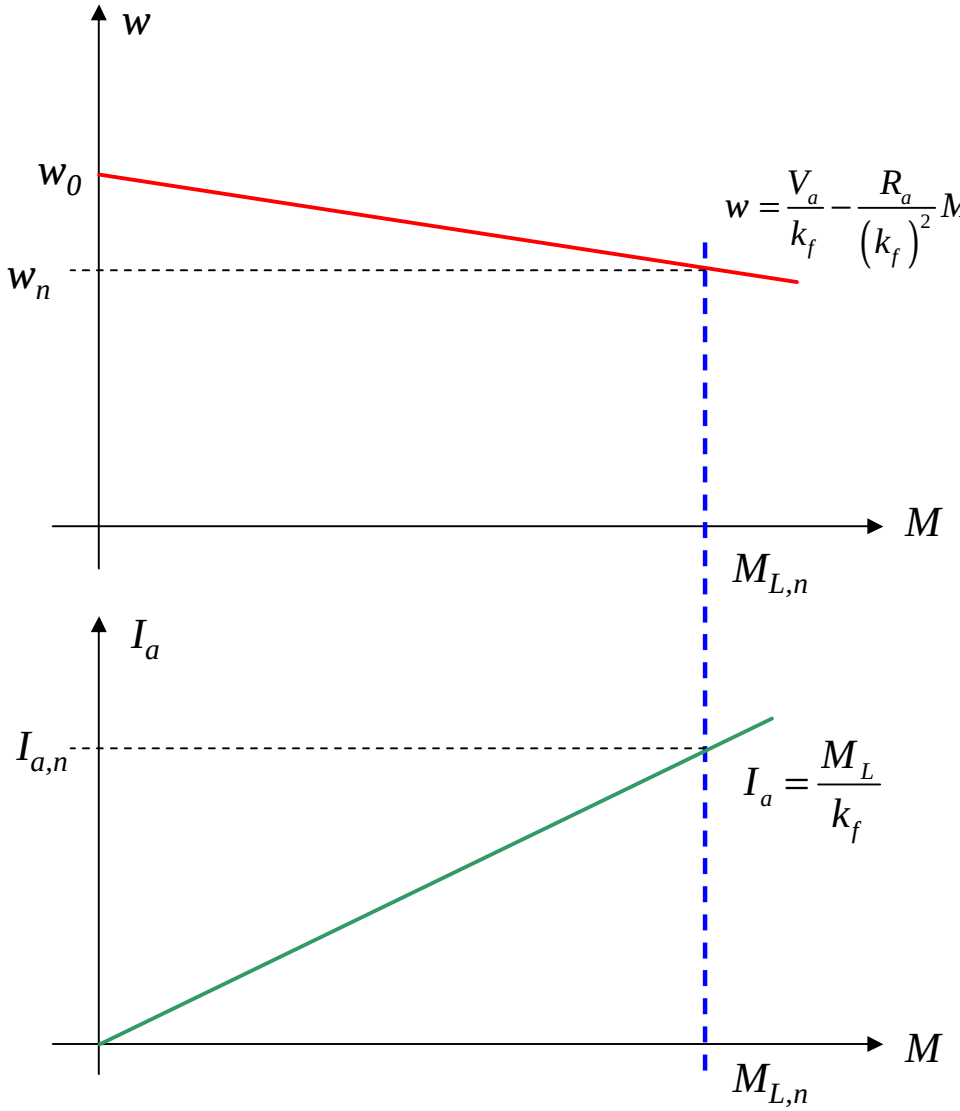
$$V_a = R_a I_a + L_a \frac{dI_a}{dt} + k_f w$$

$$k_f I_a - M_L = J \frac{dw}{dt}$$

$$V_a = R_a I_a + k_f w$$

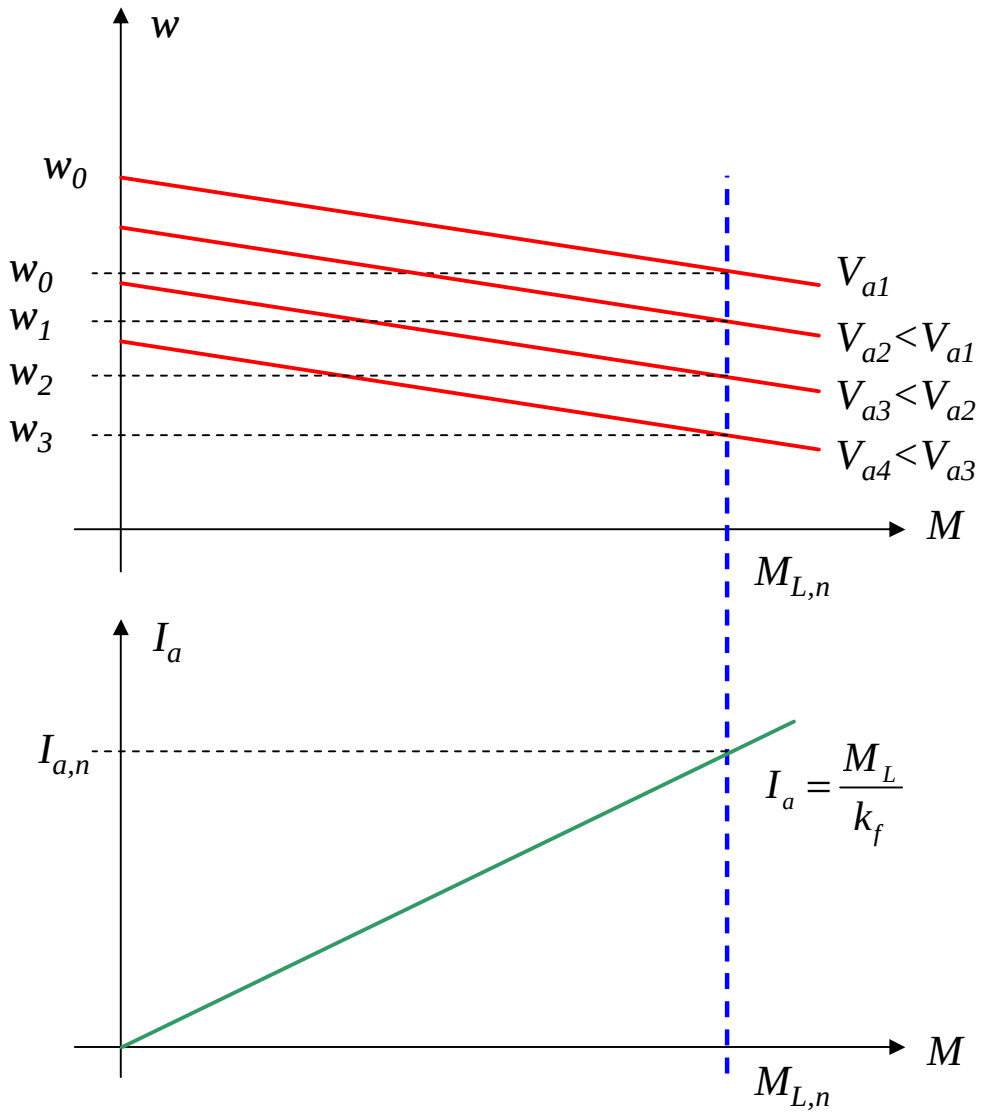
$$k_f I_a = M_L$$

$$\begin{cases} w = \dfrac{V_a}{k_f} - \dfrac{R_a}{\left(k_f\right)^2} M_L \\ I_a = \dfrac{M_L}{k_f} \end{cases}$$

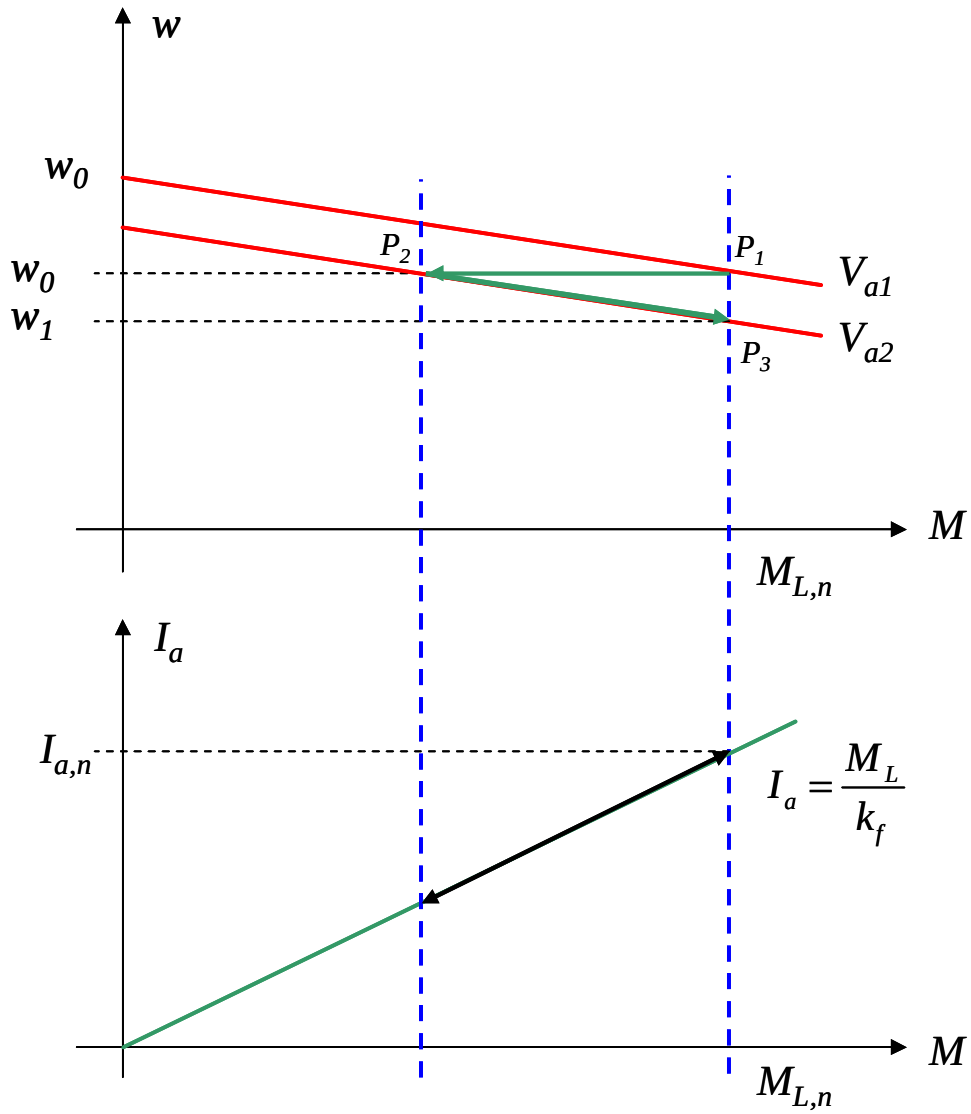


Variazione della tensione di armatura

$$w = \updownarrow \frac{V_a}{k_f} - \frac{R_a}{\left(k_f\right)^2} M_L$$

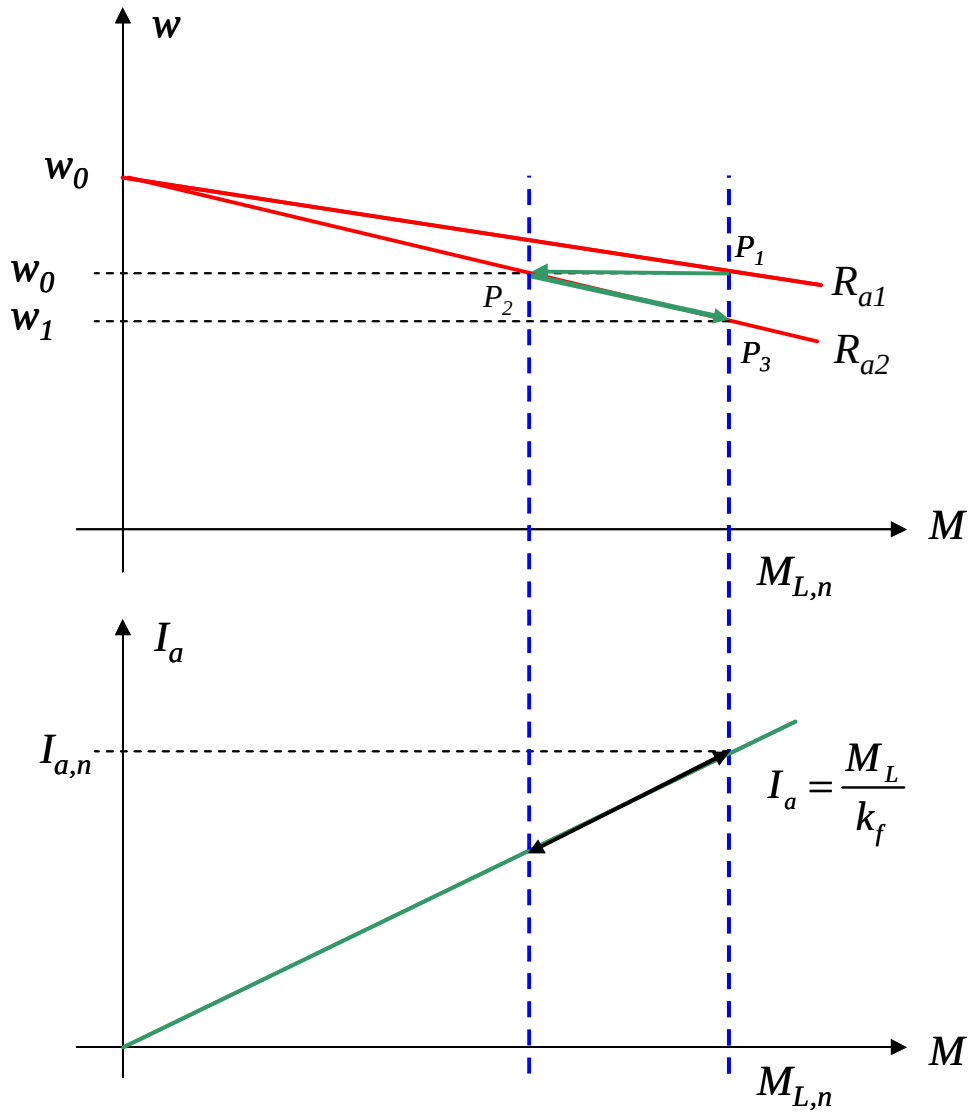


Variazione della tensione di armatura: spostamento del punto di lavoro



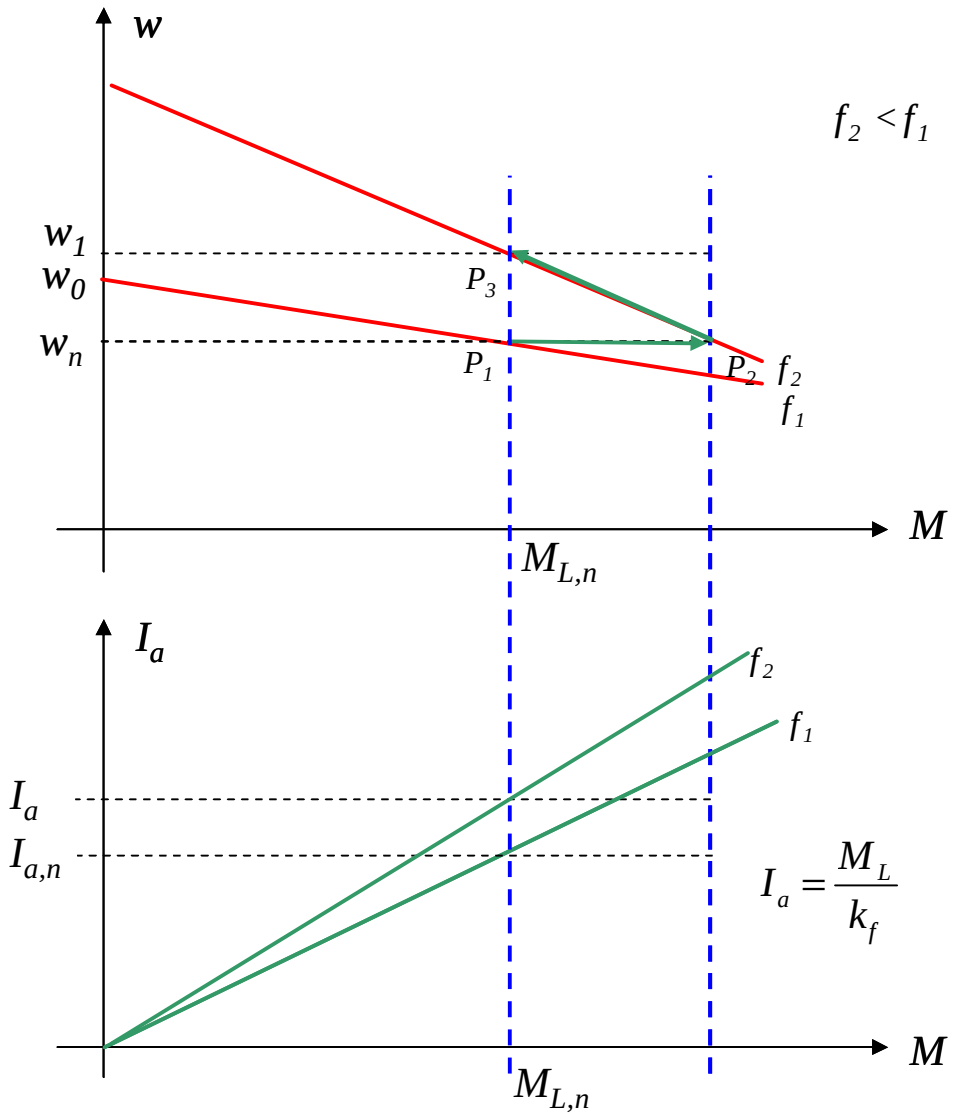
Variazione della resistenza di armatura

$$w = \frac{V_a}{k_f} - \frac{\updownarrow R_a}{\left(k_f\right)^2} M_L$$



Variazione del flusso di eccitazione

$$w = \frac{V_a}{k_f} - \frac{R_a}{(k_f)^2} M_L$$



Variazione del flusso di eccitazione

$$V_{an} = R_a I_{an} + k_{fn} w_n$$

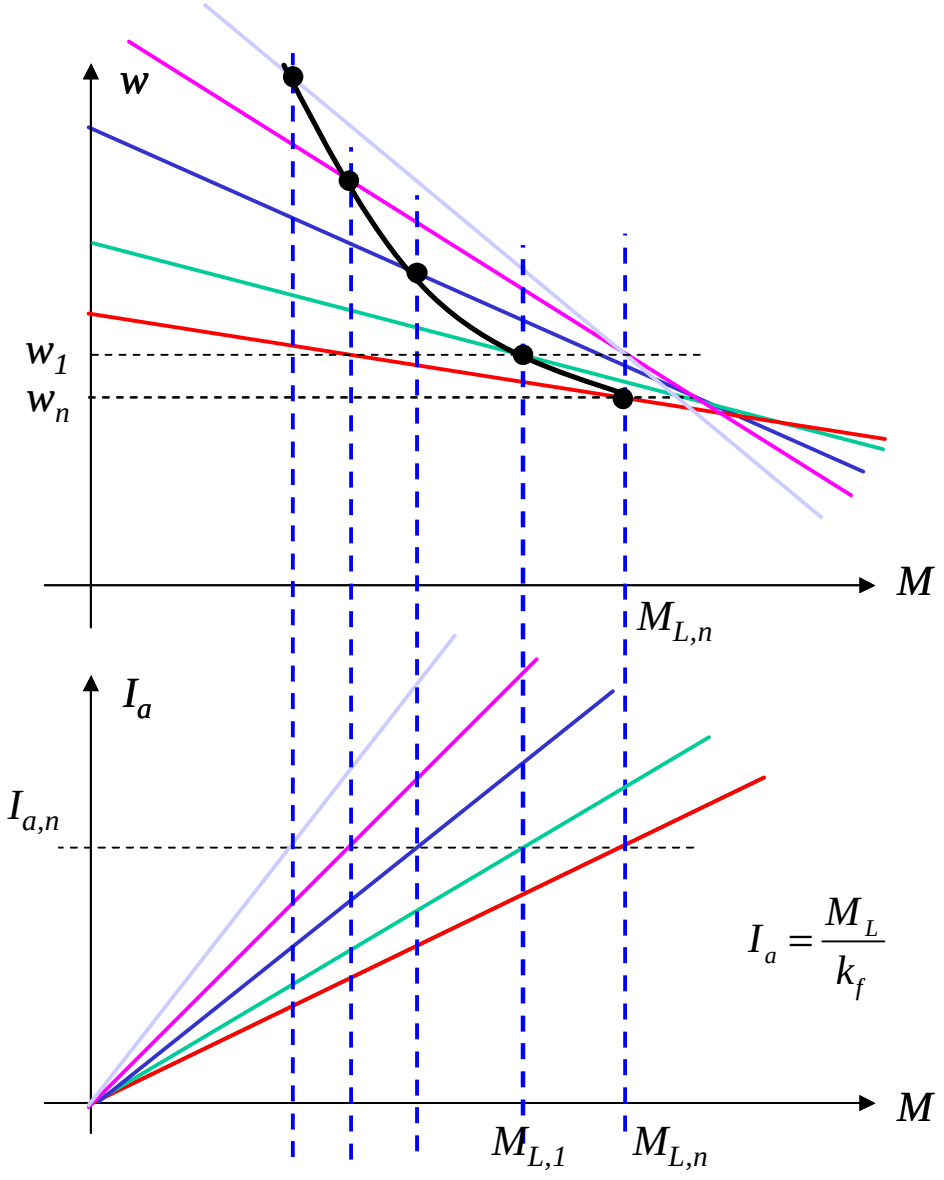
$$V_{an} = R_a I_{an} + k_{f1} w_1$$

$$k_{fn} w_n = k_{f1} w_1$$

$$M_n = k_{fn} I_{an}$$

$$M_1 = k_{f1} I_{an}$$

$$M_n w_n = M_1 w_1 = \text{costante}$$



Dominio di regolazione