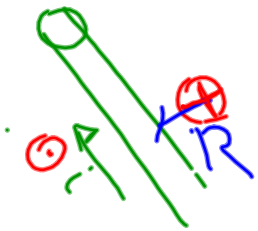
Revisão (Magnetostática)

$$\underline{F}_m = Q(\underline{v} \times \underline{B})$$

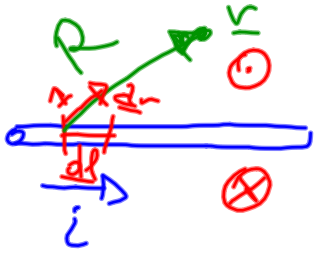
$$\underline{F}_m = i \cdot (\underline{l} \times \underline{B})$$

$$\underline{F}_T = Q(\underline{E} + \underline{v} \times \underline{B})$$

$$|\underline{B}| = \frac{\mu i}{2\pi R}$$



$$d\underline{B} = \frac{\mu}{4\pi} \frac{i\, d\underline{l} \times \underline{r}}{R^2}$$



μ: permeabilidade magnética

$\mu = \mu_r \cdot \mu_0$

μ_0: permeab. do vácuo

$\mu_0 = 4\pi \cdot 10^{-7} \quad \frac{T \cdot m}{A} \equiv \frac{T}{A/m}$

μ_r: permeab. relativa

$\mu_r = \frac{\mu}{\mu_0}$

Tipos de materiais magnéticos

Diamagnetismo $\mu_r < 1$

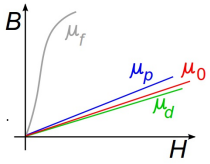
Se opõe a um campo externo

Paramagnetismo $\mu_r > 1$

- Só ocorre na presença de um campo externo;
- não retém a magnetização;
- Linear e fraco;

Ferromagnético $\mu_r > 1$

- retém o magnetismo
- não-linear
- histerese > Saturação

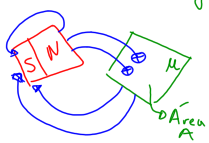


$B = \mu H \quad \left\{ H = \frac{B}{\mu} \right.$

$\left[\frac{T}{\frac{Tm}{A}} \equiv \frac{A}{m} \right]$

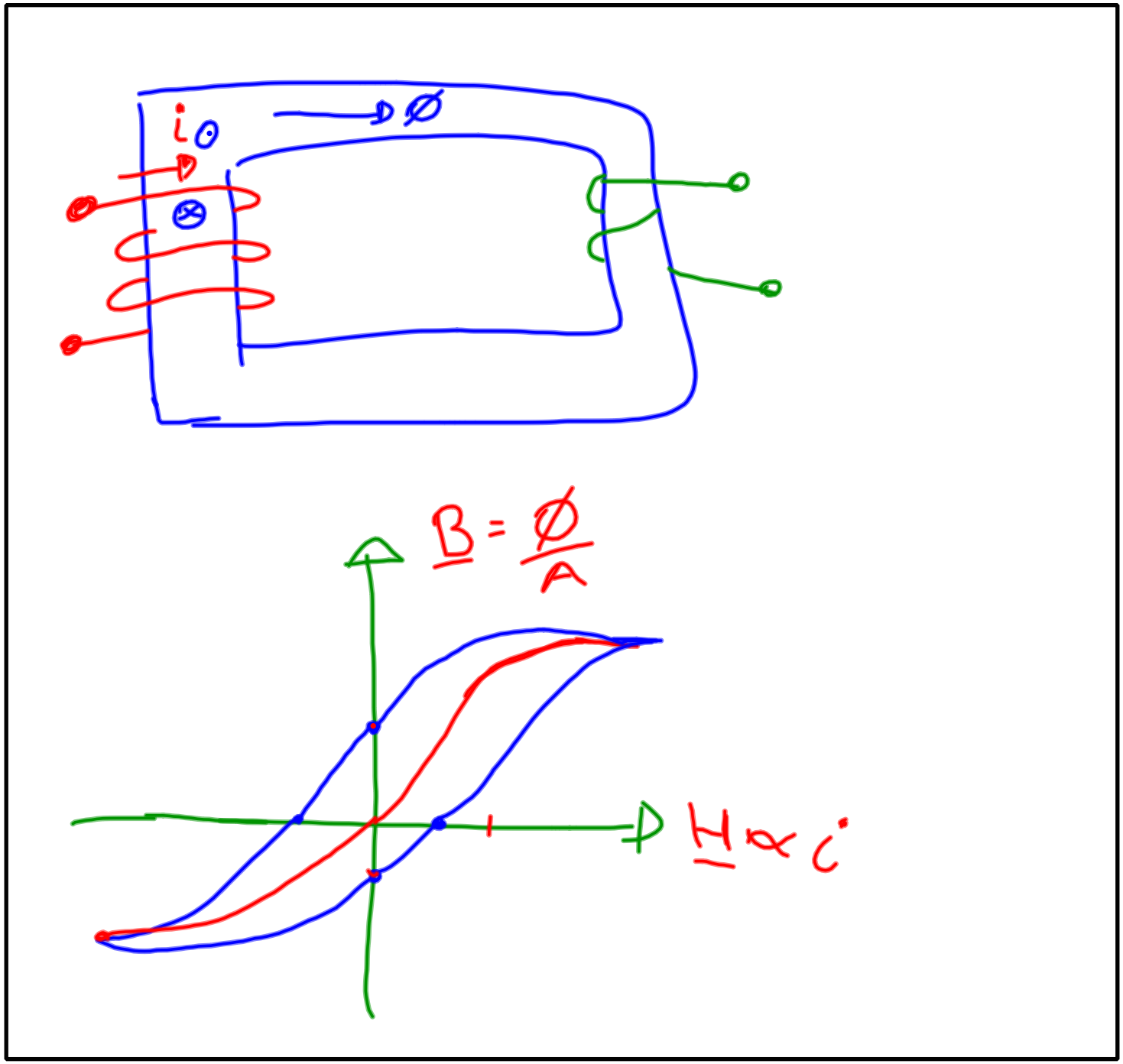
H: Campo magnético (independe do meio)

B: densidade de fluxo magnético



Φ: Fluxo magnético

$B = \frac{\Phi}{Area} = \frac{\Phi}{A}$



Título: Exemplo Histerese do Transformador (Página 4 de 5)

$$F_e = k \frac{Q_1 Q_2}{R^2} \underline{a}_{12}$$

$$k = \frac{1}{4\pi\varepsilon}$$

$$d\underline{B} = k_m i \frac{d\underline{l} \times \underline{a}_r}{R^2}$$

$$k_m = \frac{\mu}{4\pi}$$

$$\underline{D} = \varepsilon \underline{E}$$

$$\underline{B} = \mu \underline{H}$$