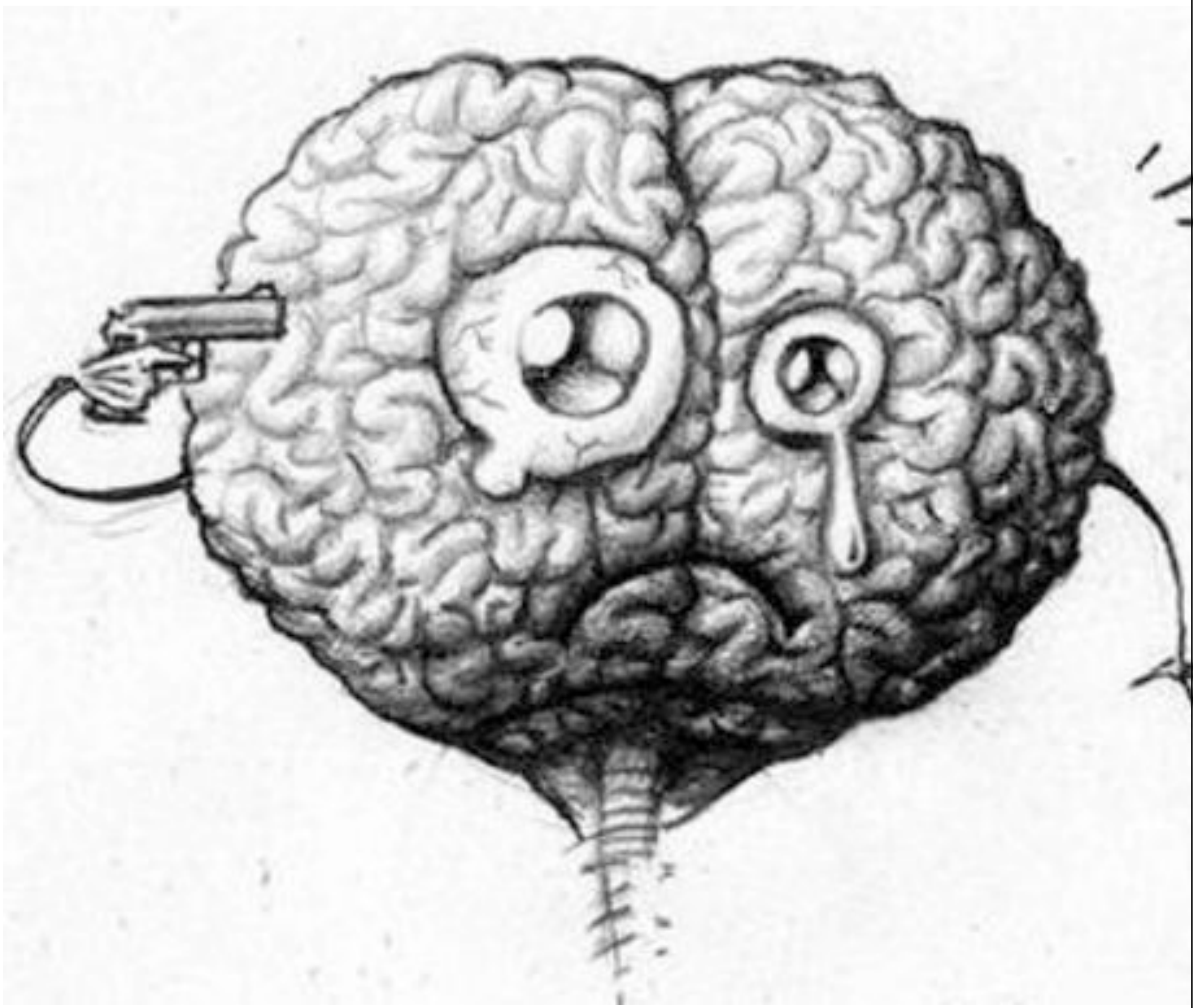
Clase 25

30/04/2013

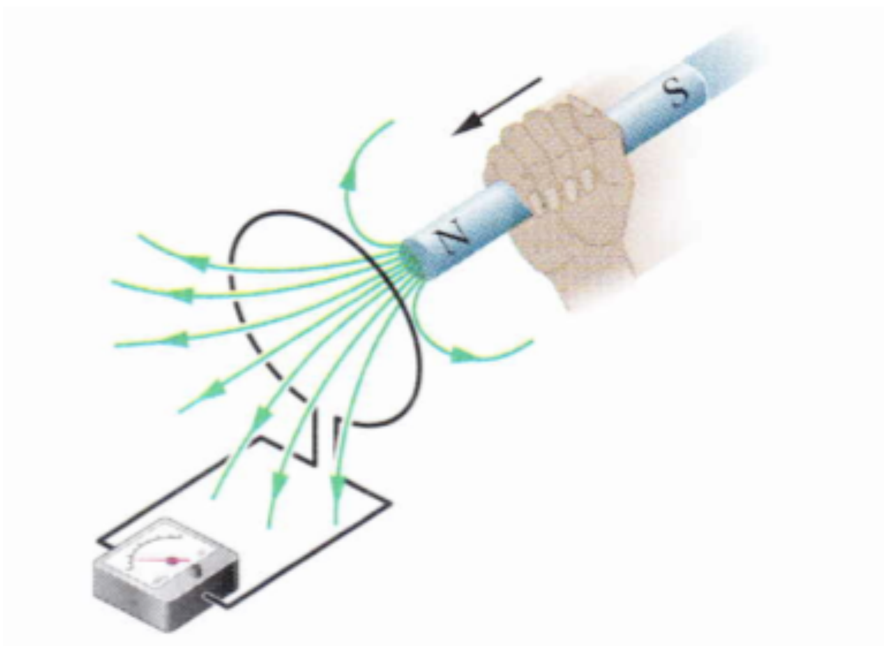
Lecturas 30.5 - 30.10

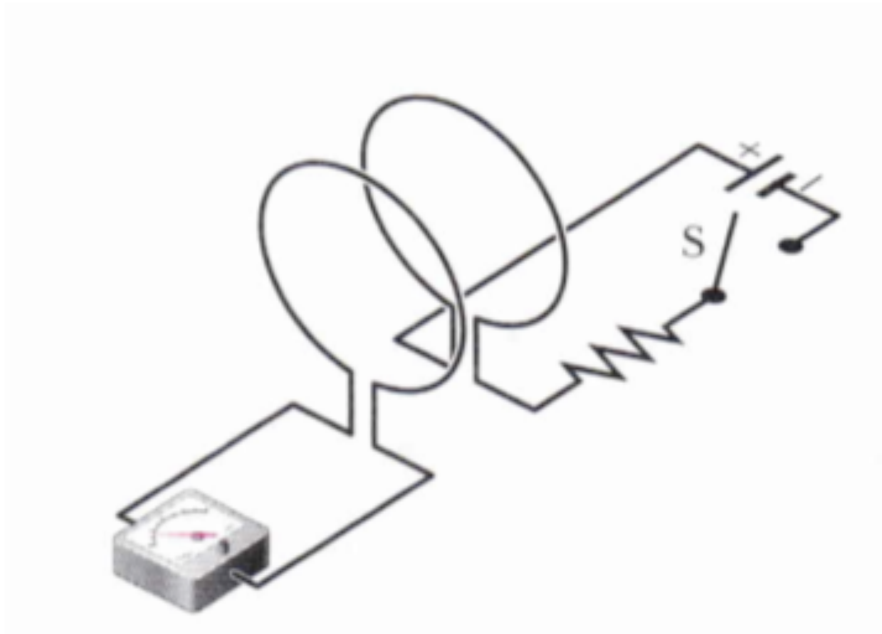
Exámen Final
Martes 14 de Mayo, 11:00 AM

B401 Sala Kogi



Ley de inducción de Faraday

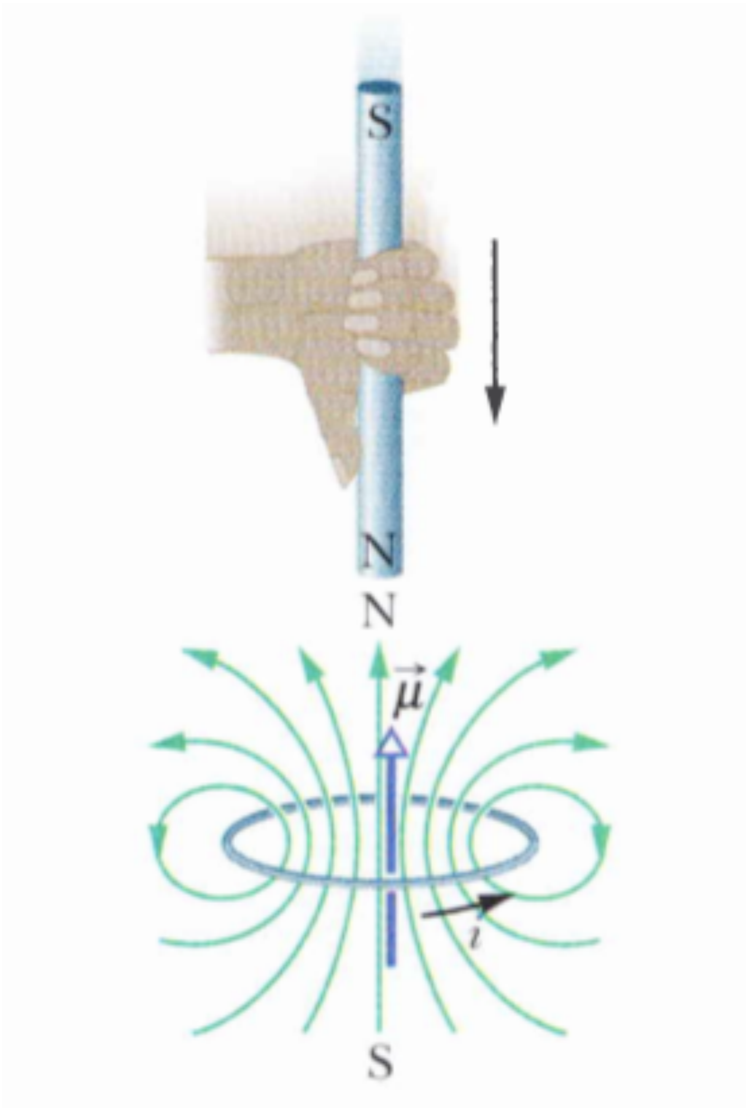




$$\Phi_B = \int \vec{B} \cdot d\vec{A}$$

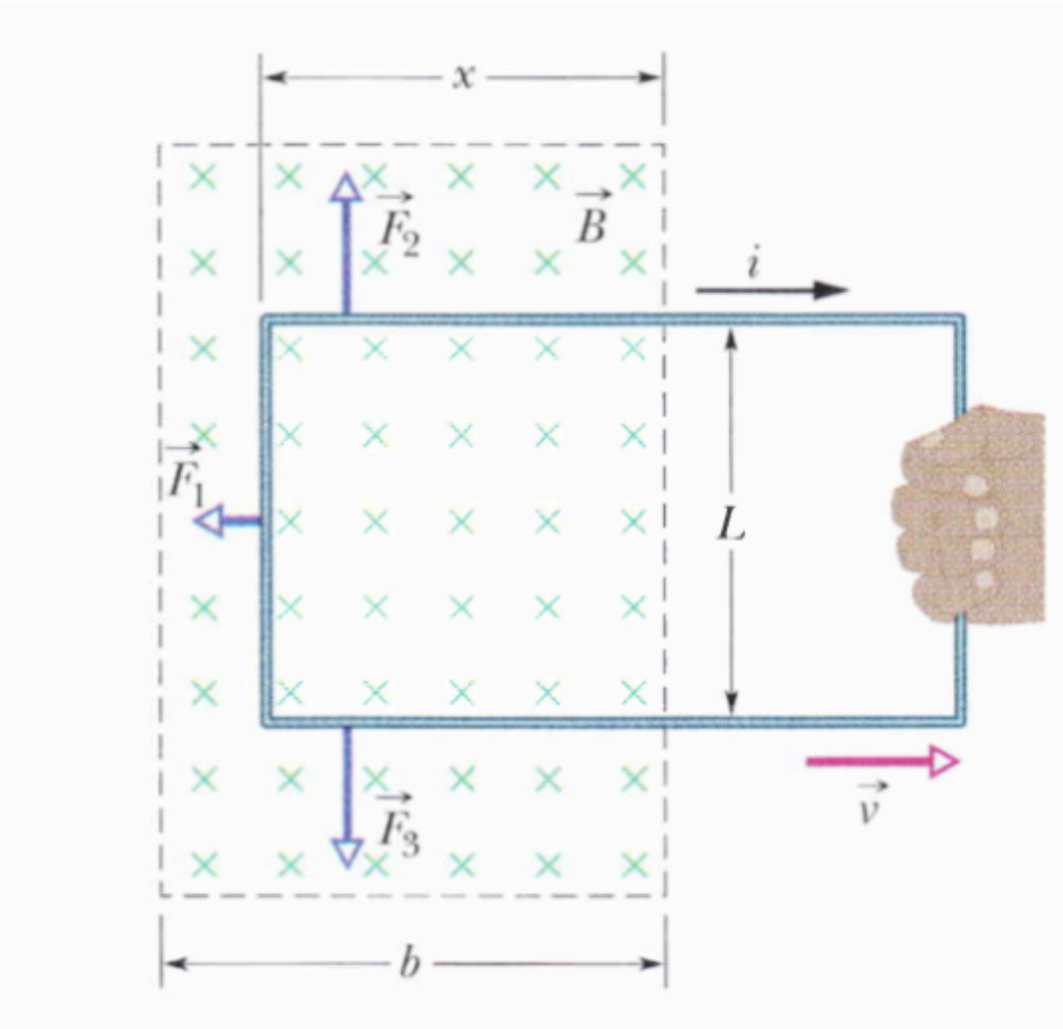
$$\Phi_B = BA \qquad (\vec{B} \perp \text{area } A, \vec{B} \text{ uniform}).$$

Ley de Lenz



Una corriente inducida tiene una dirección tal que el campo magnético debido a la corriente inducida se opone al cambio de flujo magnético que induce la corriente

Inducción



$$P = Fv,$$

$$\mathscr{E} = \frac{d\Phi_B}{dt} = \frac{d}{dt} BLx = BL\frac{dx}{dt} = BLv,$$

$$i = \frac{BLv}{R}.$$

Fuerza magnética

$$\vec{F}_d = i\vec{L} \times \vec{B}.$$

$$F = F_1 = iLB \sin 90^\circ = iLB.$$

$$F = \frac{B^2L^2v}{R}.$$

El trabajo que se realiza al tirar del lazo en el campo magnético aparece como energía térmica en el lazo

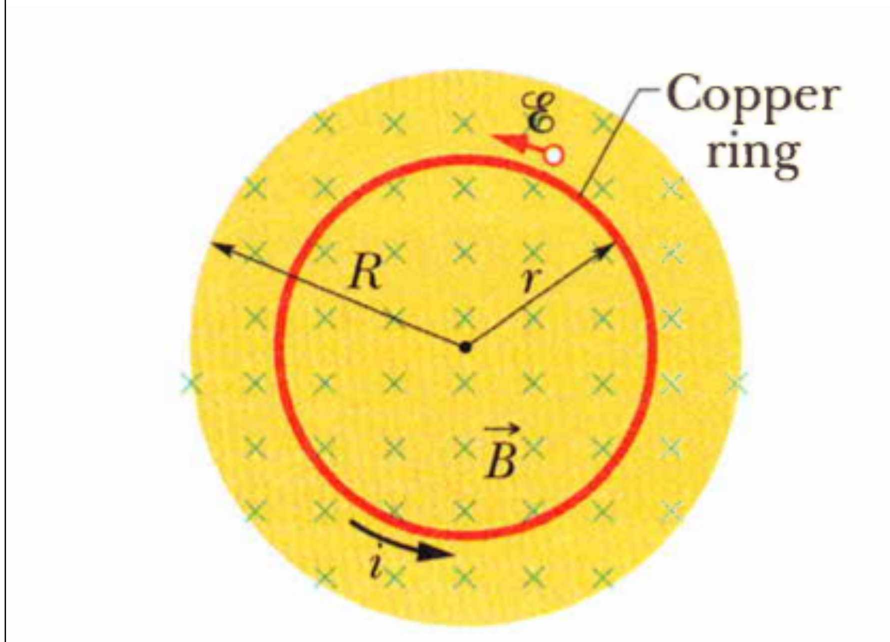
Razón a la que se hace trabajo

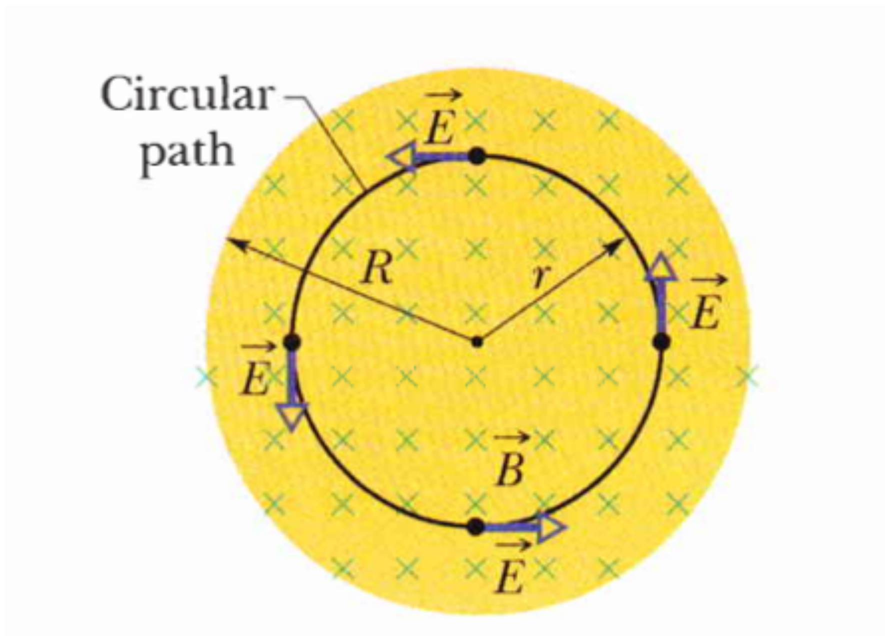
$$P = Fv = \frac{B^2L^2v^2}{R}$$

Razón de pérdida de E térmica

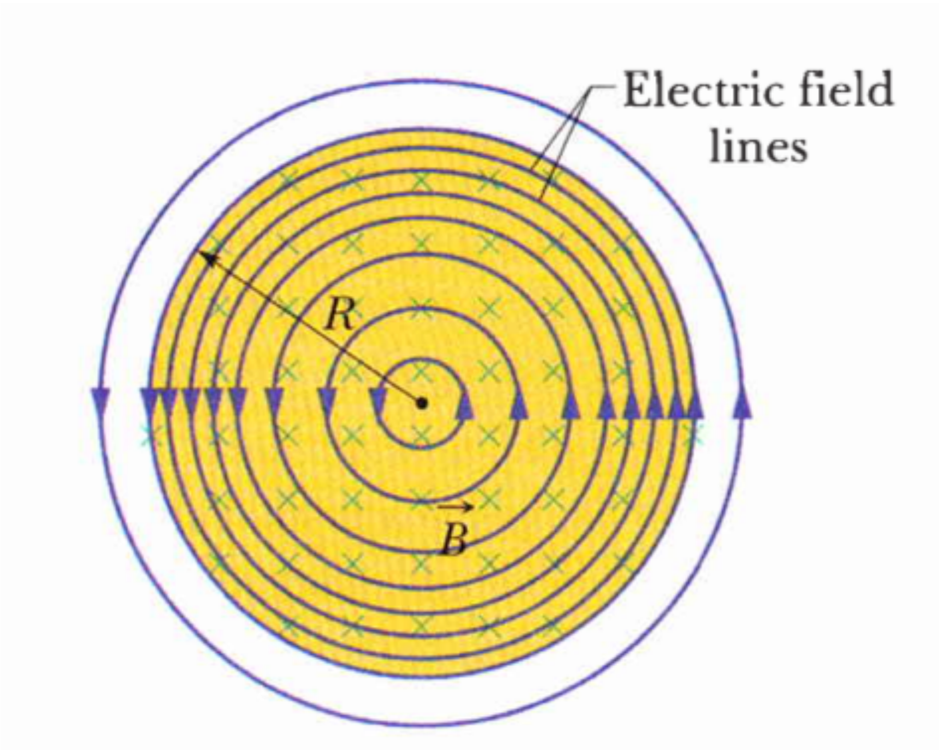
$$P = \left(\frac{BLv}{R}\right)^2 R = \frac{B^2L^2v^2}{R}$$

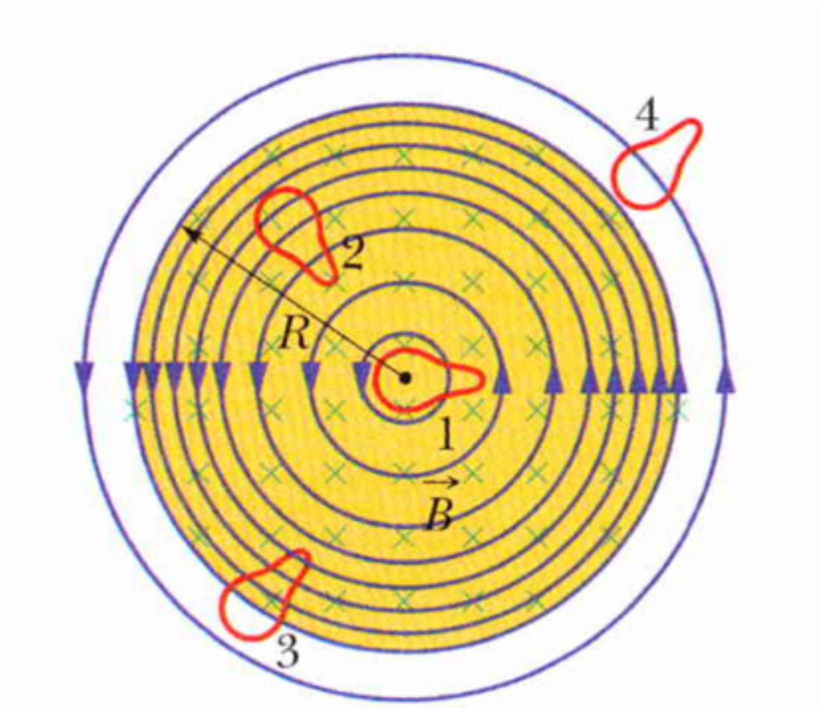
Un campo magnético variable genera un campo eléctrico





Un campo magnético variable genera un campo eléctrico





Inductores e inductancia

$$L = \frac{N\Phi_B}{i}$$

$1 \text{ henry} = 1 \text{ H} = 1 \text{ T} \cdot \text{m}^2/\text{A}.$

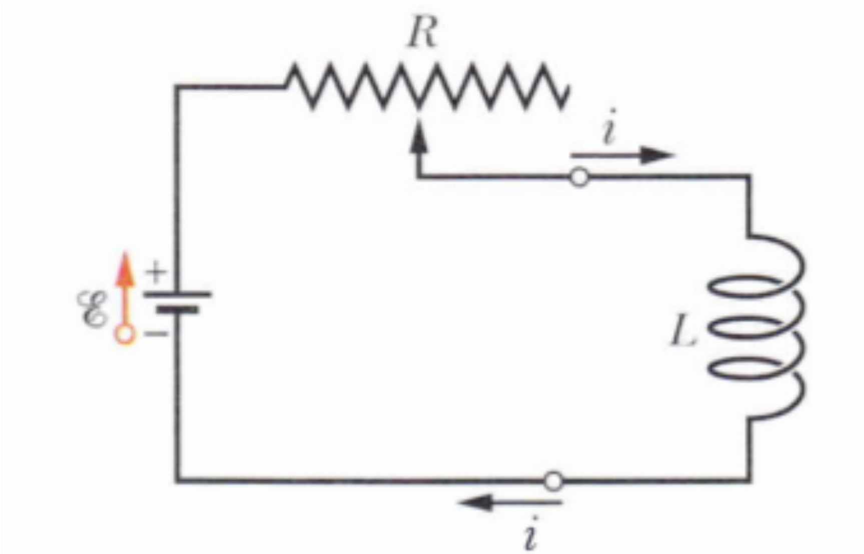
Solenoide

$$N\Phi_B = (nl)(BA),$$

$$B = \mu_0 i n,$$

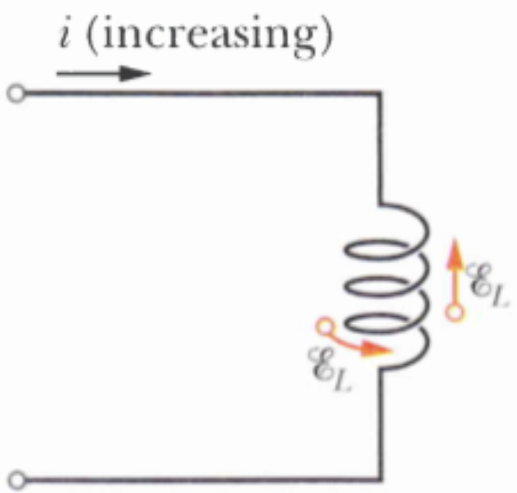
$$L = \frac{N\Phi_B}{i} = \frac{(nl)(BA)}{i} = \frac{(nl)(\mu_0 i n)(A)}{i} = \mu_0 n^2 l A.$$

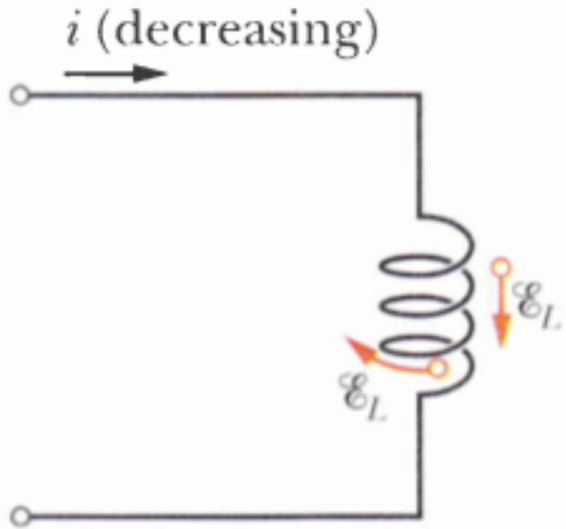
$$\frac{L}{l} = \mu_0 n^2 A$$



$$\mu_0 = 4\pi \times 10^{-7}\ \mathrm{T\cdot m/A}$$
$$= 4\pi \times 10^{-7}\ \mathrm{H/m}.$$

Autoinducción





$$N\Phi_B = Li.$$

$$\mathscr{E}_L = -\frac{d(N\Phi_B)}{dt}.$$

$$\mathscr{E}_L = -L\frac{di}{dt}$$

Circuitos RL

$$q = C\mathscr{E}(1 - e^{-t/\tau_C}).$$

$$\tau_C = RC.$$

$$q = q_0 e^{-t/\tau_C}.$$