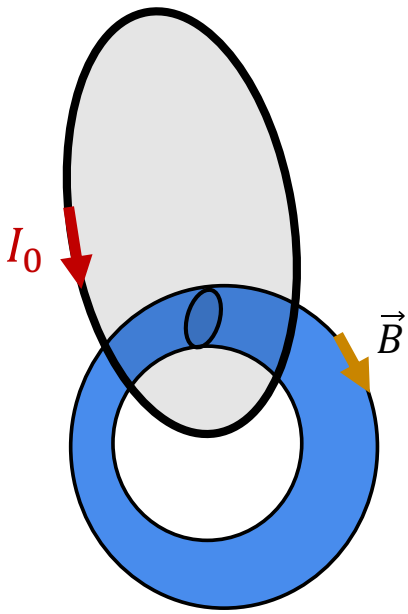
Energía magnética



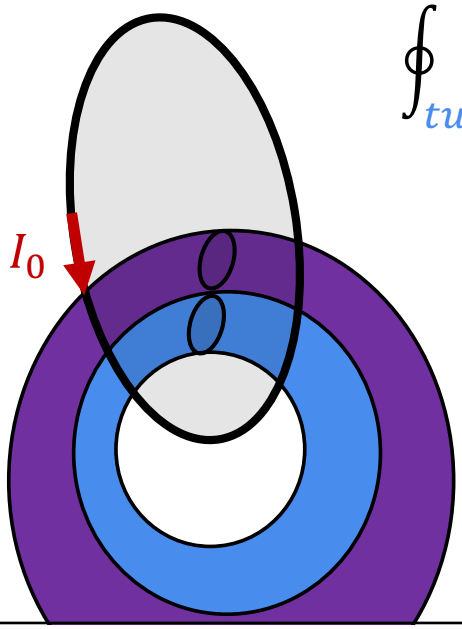
$$\oint_{tubo} \vec{B}\, d\vec{\ell} = \mu_0\, I_0$$

$$B\ \delta\ell = B\ \delta\ell\ \frac{\delta S}{\delta S}\frac{B}{B} = \frac{B^2}{B\delta S}\delta V$$

$$tubo \quad B\delta S = B_0\delta S_0$$

$$\frac{1}{B_0\ \delta S_0}\oint_{tubo} B^2 dV = \mu_0\, I_0$$

Energía magnética



$$\oint_{tubo} B^2 dV = \mu_0 \, I_0 \, B_0 \, \delta S_0$$

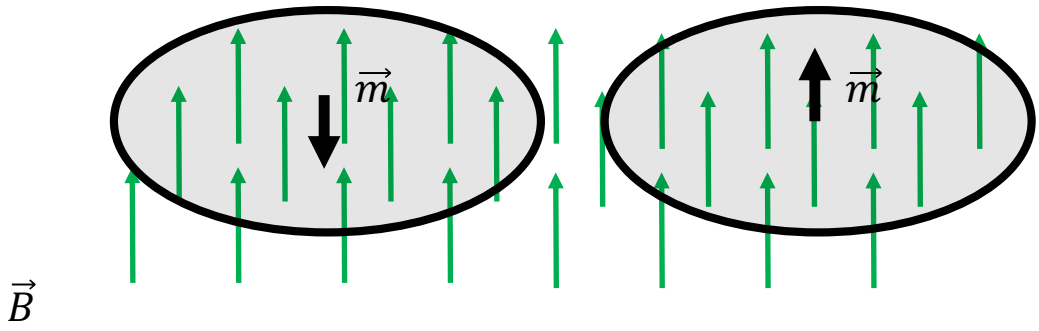
$$\sum_{tubos} \int B^2 dV = \mu_0 \, I_0 \sum_{tubos} B_0 \, \delta S_0$$

$$\iiint_{-\infty}^{\infty} B^2 dV = \mu_0 \, I_0 \Phi_0$$

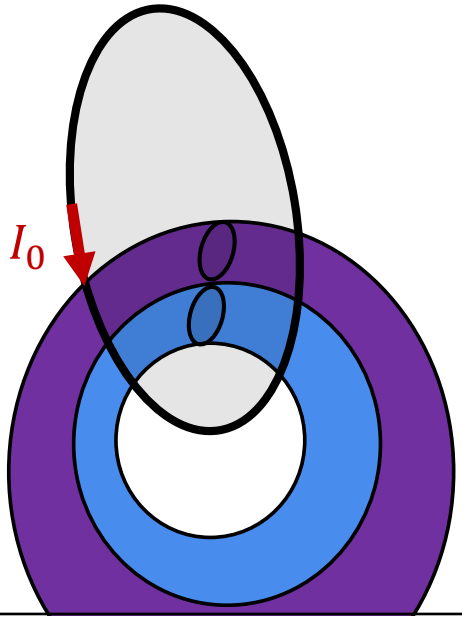
Energía magnética

$$U = -\int \vec{F} \, d\vec{\ell} = -Trabajo$$

$$U = -\vec{m}\,\vec{B}$$



Energía magnética

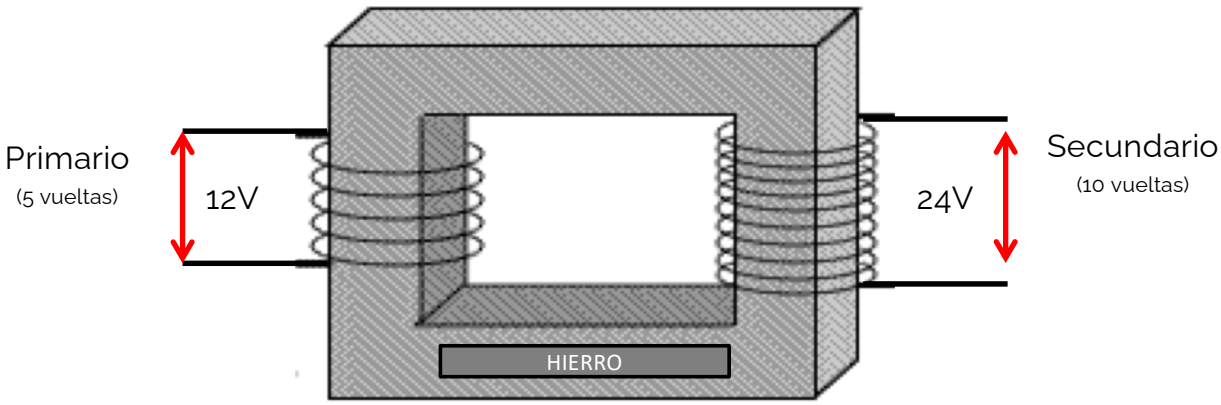


$$U_m = \frac{1}{2} I_0 \Phi_0 = \frac{1}{2\mu_0} \iiint_{-\infty}^{\infty} B^2 dV$$

Energía de una distribución continua de cargas

$$U = \frac{\varepsilon_0}{2} \iiint_{\text{espacio}} |\vec{E}(\vec{r}')|^2 \, dV'$$

Transformadores



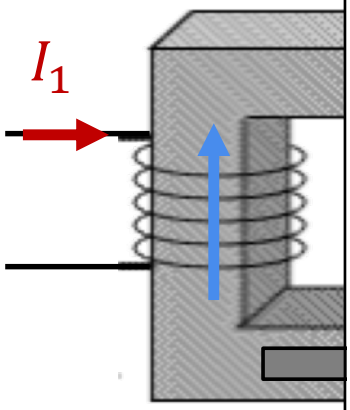
Transformadores

Corriente Campo Magnético (B)

$$fem_1 = -\frac{d(B\ S\ N_1)}{dt}$$

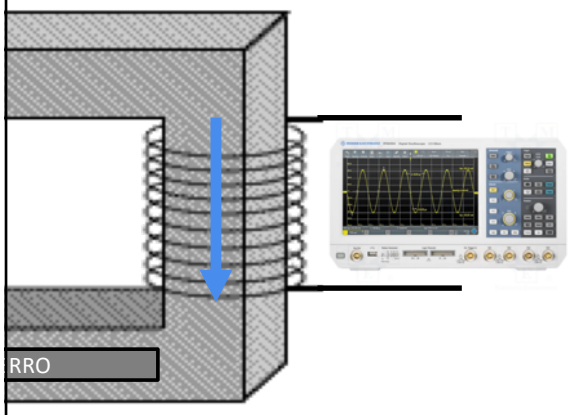
$$= -S\ N_1 \frac{dB}{dt}$$

Fuente de Corriente Alterna (Amplitud, Frecuencia)



Primario
(5 vueltas)

Transformadores

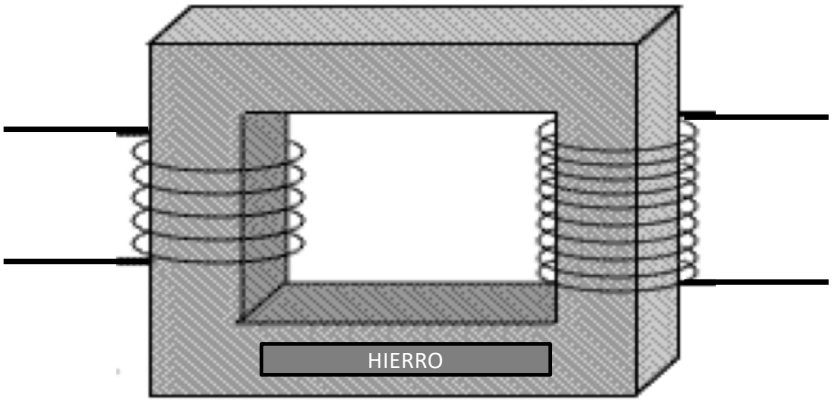


Secundario
(10 vueltas)

$$fem_2 = -\frac{d\Phi_2}{dt}$$

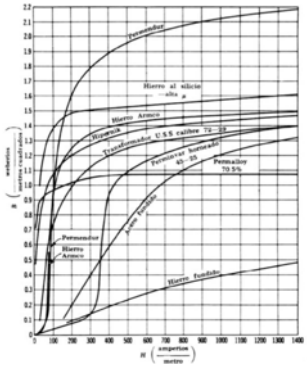
$$= -S\ N_2 \frac{dB}{dt}$$

Transformadores



$$\frac{fem_2}{fem_1} = \frac{N_2}{N_1}$$

Pero …



Transformadores

Circuitos eléctricos: representación

$$Q = C\,V \qquad \Phi = LI$$

$$V = I\,R \qquad I = C\frac{dV}{dt} \qquad V = L\frac{dI}{dt}$$