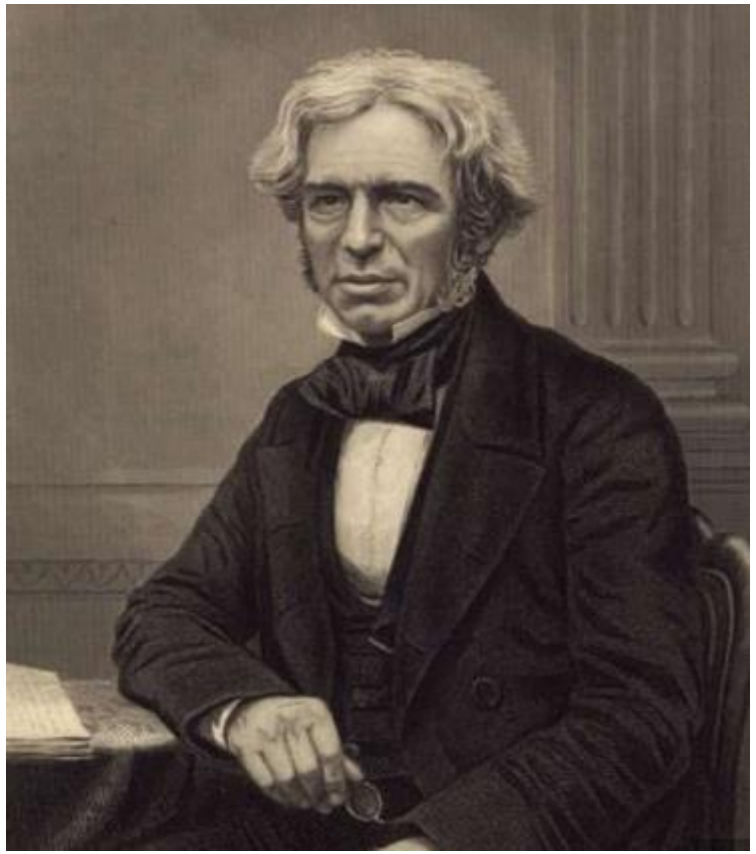
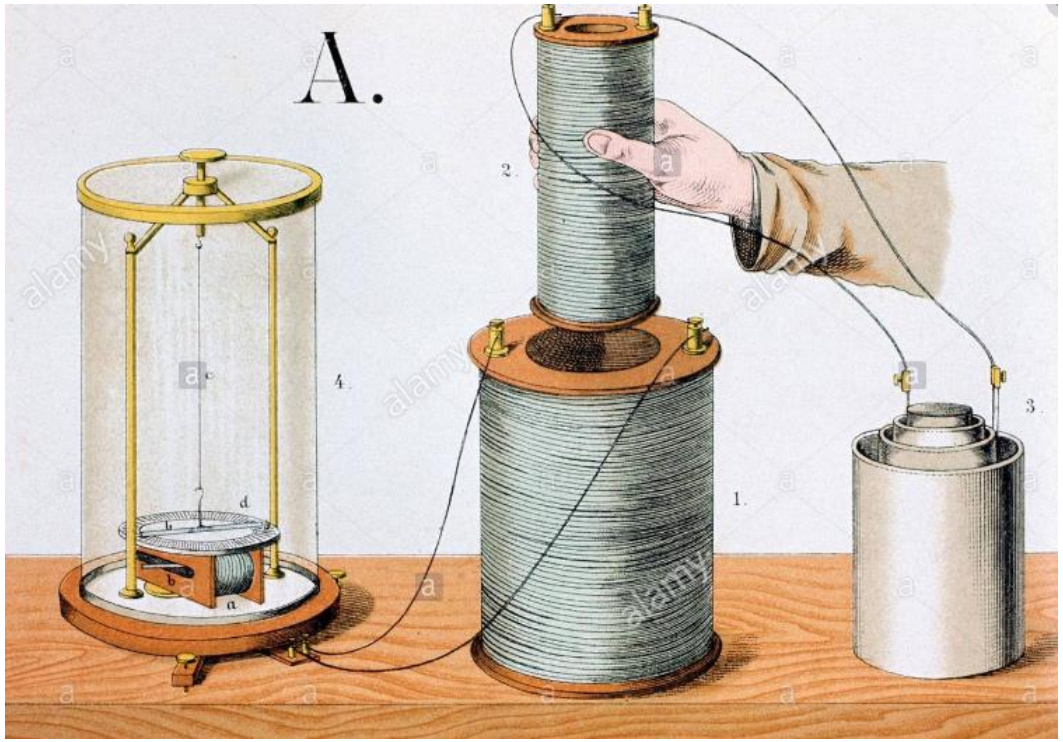
Michael Faraday (1791-1867)



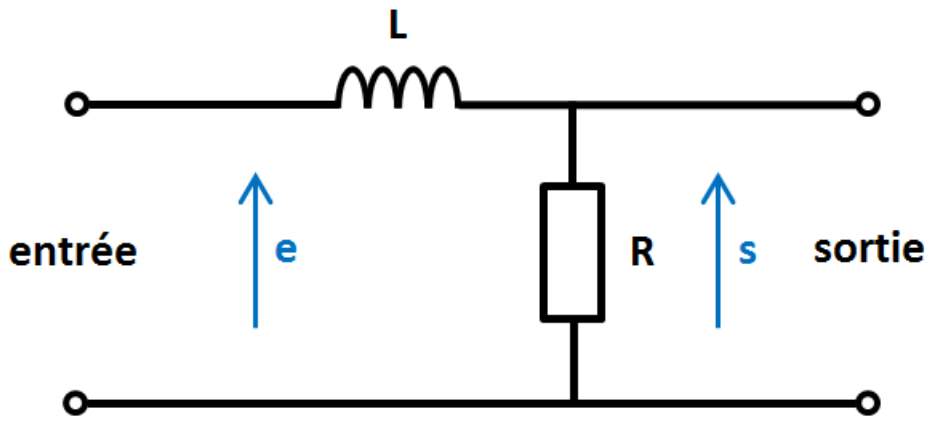
1831



https://www.alamyimages.fr

Expérience : détermination d'inductance

$$L = \frac{\mu_0 N^2 S}{l}$$



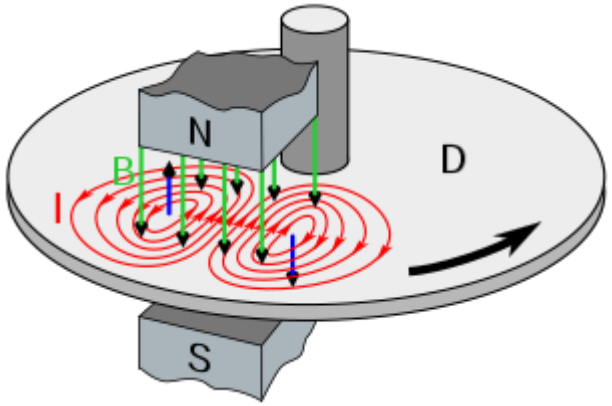
Fonction de Transfert

$$\underline{H}(\omega) = \frac{\underline{U_s}}{\underline{U_e}} = \frac{1}{1+j\frac{L}{R}\omega}$$

$$|\underline{H}(\omega)|^2 = \frac{1}{1+\frac{L^2}{R^2}\omega^2}$$

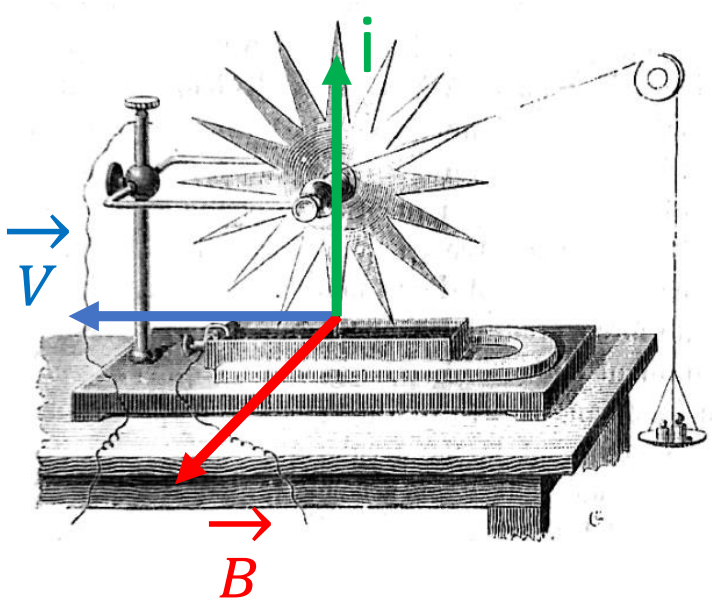
Applications

Freinage par induction



Léon Foucault (1819-1868)

Roue de Barlow (1822)



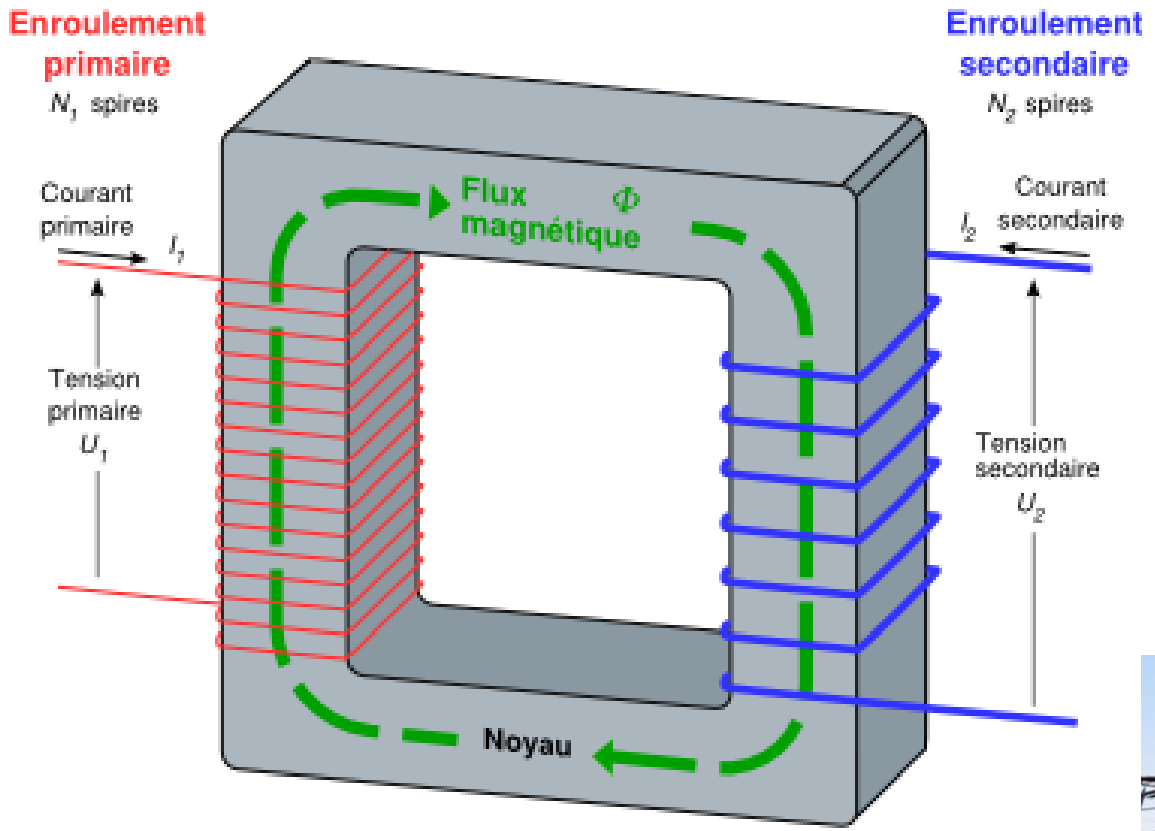
Peter Barlow (1776-1862)

Alternateur (Centrale, dynamo…)

Applications

https://www.youtube.com/watch?v=nIFSZfKTUKA

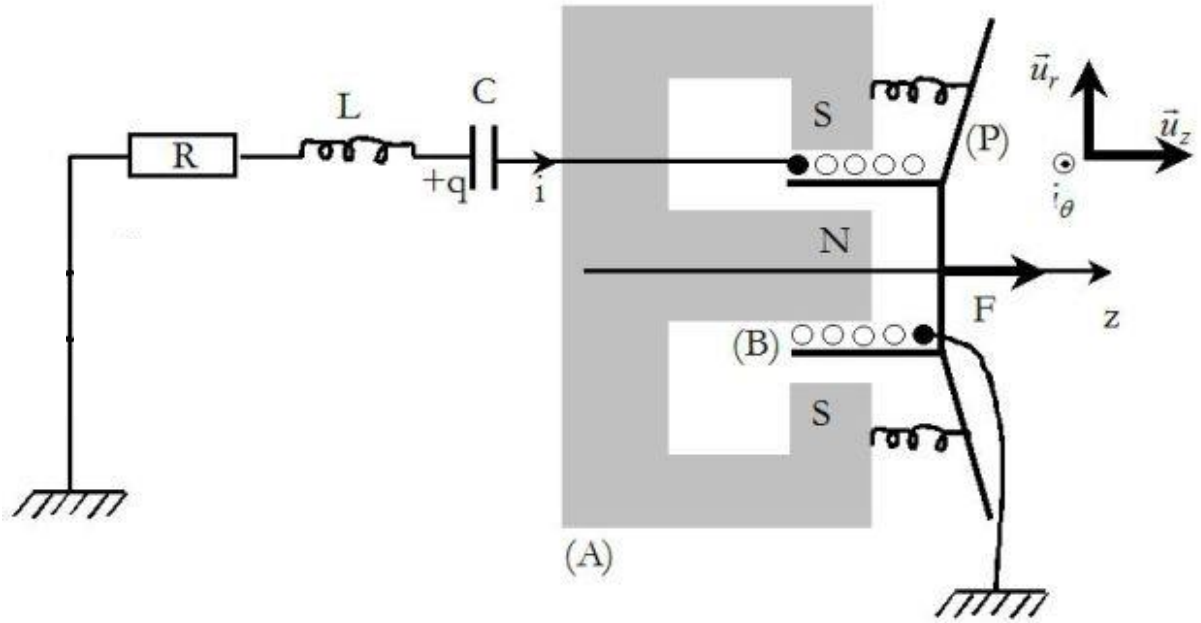
Transformateur



$$\frac{U_2}{U_1} = \frac{N_2}{N_1}$$

- Transformateur d'isolement
- Transport d'électricité

Le microphone



Equations mécanique et électrique

$$(\mathrm{E}) \quad vB2\pi aN = Ri + L\frac{di}{dt} + \frac{q}{C}$$

$$(\mathrm{M}) \quad m\ddot{z} = -\alpha\dot{z} - kz - i2\pi aNB$$

Bilan énergétique

$$(\mathrm{M}) \quad \frac{d}{dt}(\frac{1}{2}m\dot{z}^2 + \frac{1}{2}kz^2) = -\alpha\dot{z}^2 - iv2\pi aNB$$

$$(\mathrm{E}) \quad \frac{d}{dt}(\frac{1}{2}Li^2 + \frac{1}{2C}q^2) = -Ri^2 + ivB2\pi aN$$

$$(\mathrm{E})+(\mathrm{M}) \quad \frac{d}{dt}(E_{bob} + E_{Capa} + E_c + E_k) = -Ri^2 + -\alpha\dot{z}^2$$

Inductance Mutuelle