## Équations à connaître

$$q = \pm Ne$$

$$I = \frac{q}{\Delta t}$$

$$\Delta V = R \cdot I$$

$$P = \Delta V \cdot I$$

$$R_{éq} = \sum R_i$$

$$\frac{1}{R_{éq}} = \sum \frac{1}{R_i}$$

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$$\vec{F}_e = q\vec{E}$$

$$V = \sum \frac{kq}{r}$$

$$C = \frac{q}{\Delta V}$$

$$C_{éq} = \frac{1}{\sum \frac{1}{C_i}}$$

$$C_{éq} = \sum C_i$$

$$\tau = RC$$

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$$n = \frac{N}{l}$$

$$\vec{F} = q \cdot \vec{v} \times \vec{B}$$

$$f = \frac{1}{T}$$

## Équations à connaître venant des cours préalables

$$\vec{F} = m\vec{a}$$

$$K = \tfrac{1}{2}mv^2$$

$$A_{cercle} = \pi r^2$$

$$\text{Circ} = 2\pi r$$

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## Constantes fournies

$$e = 1{,}602 \times 10^{-19}\ \text{C}$$

$$k = 8{,}988 \times 10^{9}\ \frac{\text{N}\cdot\text{m}^2}{\text{C}^2}$$

$$1\ \text{eV} = 1{,}602 \times 10^{-19}\ \text{J}$$

$$\varepsilon_0 = 8{,}854 \times 10^{-12}\ \frac{\text{C}^2}{\text{N}\cdot\text{m}^2}$$

$$\mu_0 = 4\pi \times 10^{-7}\ \frac{\text{T}\cdot\text{m}}{\text{A}}$$

Toutes les valeurs propres aux matériaux (ex : résistivité du cuivre)

## Équations fournies

$$I = neAv_d$$

$$R = \frac{\rho l}{A}$$

$$\Delta V_{pile} = \mathcal{E} - rI$$

$$V_A + \sum \Delta V_{A\to B} = V_B$$

$$F_e = \frac{k|q_1 q_2|}{r^2}$$

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$$E = \frac{k|q|}{r^2}$$

$$E = \frac{2k|\lambda|}{R}$$

$$E = \frac{|\sigma|}{2\varepsilon_0}$$

$$\lambda = \frac{q}{L}$$

$$\sigma = \frac{q}{A}$$

$$x = x_0 + v_{0x}t + \tfrac{1}{2}a_x t^2$$

$$v_x = v_{0x} + a_x t$$

$$v_x^2 = v_{0x}^2 + 2a_x(x - x_0)$$

$$U_e = \sum_{i<j} \frac{kq_i q_j}{r_{ij}}$$

$$U_e = qV$$

$$\Delta V = -\vec{E} \bullet \overrightarrow{\Delta s}$$

$$\vec{A} \bullet \vec{B} = AB\cos\theta_{AB} = A_x B_x + A_y B_y + A_z B_z$$

$$\Delta K = -q\Delta V$$

$$W_{ext} = \Delta U$$

$$W_{ext} = q\Delta V$$

$$\frac{\sigma_1}{\sigma_2} = \frac{R_2}{R_1}$$

$$C = \frac{\varepsilon_0 A}{d}$$

$$U_e = \tfrac{1}{2}q\Delta V = \tfrac{1}{2}C(\Delta V)^2 = \frac{q^2}{2C}$$

$$C_D = \kappa C_0$$

$$q_{max} = C\mathcal{E}$$

$$q(t) = q_{max} \cdot e^{\left(\frac{-t}{RC}\right)}$$

$$T_{½} = RC\ln 2$$

$$I = I_{max} e^{\left(\frac{-t}{RC}\right)}$$

$$I_{max} = \frac{q_{max}}{RC}$$

$$q(t) = q_{max}\left(1 - e^{\left(\frac{-t}{RC}\right)}\right)$$

$$I_{max} = \frac{\mathcal{E}}{R}$$

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$$\left|\vec{A} \times \vec{B}\right| = AB\sin\theta_{AB}$$

$$\vec{A} \times \vec{B} = (A_y B_z - A_z B_y)\vec{\imath} - (A_x B_z - A_z B_x)\vec{\jmath} + (A_x B_y - A_y B_x)\vec{k}$$

$$B = \frac{\mu_0 I}{2\pi R}$$

$$B = \frac{\mu_0 NI}{2a}\sin^3\alpha$$

$$B = \frac{\mu_0 NI}{2a}$$

$$B = \mu_0 nI$$

$$\vec{F} = I \cdot \vec{l} \times \vec{B}$$

$$\vec{\tau} = NI\vec{A} \times \vec{B}$$

$$a_r = \frac{v^2}{r}$$

$$T = \frac{2\pi m}{|q|B}$$

$$r = \frac{mv_\perp}{|q|B}$$

$$\Phi_B = \vec{B} \bullet \vec{A}$$

$$\mathcal{E} = -\frac{N\text{d}\Phi_B}{\text{d}t}$$

## Équations optionnelles ou non essentielles

$$P = \frac{\Delta V^2}{R} = RI^2$$

$$P = \mathcal{E}I$$

$$\sum \Delta V = 0$$

$$\sum I = 0$$

$$k = \frac{1}{4\pi\varepsilon_0}$$

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$$\Delta V = \pm E s_{||}$$

$$\Delta V(t) = \Delta V_{max} \cdot e^{\left(\frac{-t}{RC}\right)}$$

$$\Delta V(t) = \Delta V_{max} \cdot \left(1 - e^{\left(\frac{-t}{RC}\right)}\right)$$

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$$F = |q|vB\sin\theta_{vB}$$

$$F = IlB\sin\theta_{lB}$$

$$F_{21} = I_2 l_2 B_1 = I_2 l_2 \frac{\mu_0 I_1}{2\pi d}$$

$$\tau = NIAB\sin\theta_{AB}$$

$$f = \frac{|q|B}{2\pi m}$$

$$\vec{F} = q\left(\vec{E} + \vec{v} \times \vec{B}\right)$$