Équations importantes du tome 2

$$\vec{F}_e = q\vec{E}$$
$$F_e = \frac{k|q_1 q_2|}{r^2} \qquad E = \frac{k|q|}{r^2}$$

$$\vec{p} = q\vec{d}$$

$$E = \frac{2k|\lambda|}{R}$$
$$\lambda = q/L \qquad dq = \lambda\, dx$$

$$E = \frac{|\sigma|}{2\varepsilon_0}$$
$$\sigma = q/A \qquad dq = \sigma\, dA$$

$$\Phi_e = \pm E_\perp A \qquad \Phi_{e(sf)} = \frac{q_i}{\varepsilon_0}$$

$$E = \frac{|\sigma_{loc}|}{\varepsilon_0}$$

$$U_e = qV$$
$$U_e = \frac{kq_1q_2}{r} \qquad V = \frac{kq}{r}$$

$$\Delta V = -\vec{E}\bullet\vec{s} = -Es\cos\theta_{Es} = \pm E s_{//}$$
$$E_x = -\frac{\Delta V}{\Delta x} \qquad E_x = -\frac{dV}{dx}$$
$$V_B - V_A = -\int_{x_A}^{x_B} E_x\, dx$$

$$C = \frac{q}{\Delta V} \qquad E = \frac{E_{ext}}{\kappa}$$
$$C_{vide} = \frac{\varepsilon_0 A}{d} \qquad C = \kappa C_{vide}$$

$$U = \frac{1}{2}\frac{q^2}{C} = \frac{1}{2}C(\Delta V)^2 = \frac{1}{2}q\,\Delta V$$
$$u_e = \frac{1}{2}\varepsilon_0 E^2$$

$$\mathcal{E} = \left|\frac{\Delta U}{q}\right|$$
$$\Delta V_{\text{pile idéale}} = \mathcal{E}$$

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

$$R = \frac{\Delta V}{I} \qquad \Delta V = RI$$
$$R = \frac{\rho\ell}{A}$$

$$P = I\,\Delta V \qquad P = RI^2$$
$$P = \frac{(\Delta V)^2}{R}$$

$$\sum I = 0 \qquad \sum \Delta V = 0$$

$$R_{éq} = \sum R_i \qquad R_{éq} = \left[\sum \frac{1}{R_i}\right]^{-1}$$

$$\Delta V = \mathcal{E} \pm rI$$

$$\Delta V_1 = \left(\frac{R_1}{R_1 + R_2}\right)\Delta V$$
$$I_1 = \left(\frac{R_2}{R_1 + R_2}\right)I$$

$$\mathcal{E}_{eff} = \frac{\mathcal{E}_{max}}{\sqrt{2}} \qquad I_{eff} = \frac{I_{max}}{\sqrt{2}}$$

$$q_{cc} = C\mathcal{E} \qquad \tau = RC$$
$$T_{1/2} = \tau\ \ln 2$$
$$q = q_{cc}(1 - e^{-t/\tau})$$
$$q = q_{cc}e^{-t/\tau} \qquad I = \frac{q_{cc}}{\tau}e^{-t/\tau}$$

$$C_{éq} = \left[\sum \frac{1}{C_i}\right]^{-1} \qquad C_{éq} = \sum C_i$$

$$\vec{J} = nq\vec{v}_d \qquad \vec{E} = \rho\vec{J}$$
$$J = \frac{I}{A}$$

$$\vec{F}_m = q\vec{v}\times\vec{B}$$
$$F_m = |q|vB\sin\theta_{vB}$$
$$\vec{F}_m = I\vec{\ell}\times\vec{B}$$
$$F_m = I\ell B\sin\theta_{\ell B}$$

$$\mu = IA \qquad \tau = \mu B\sin\theta_{\mu B}$$

$$B = \frac{\mu_0}{2\pi}\frac{I}{R}$$
$$B = \frac{\mu_0}{4\pi}\frac{I}{R}|\sin\alpha_2 - \sin\alpha_1|$$

$$B = \frac{\mu_0 I}{2R} \qquad B = \frac{\mu_0 I}{2R}\sin^3\alpha$$

$$B = \frac{\mu_0 nI}{2}|\cos\alpha_2 - \cos\alpha_1|$$
$$B = \mu_0 nI$$

$$dB = \frac{\mu_0}{4\pi}\frac{I\,d\ell\sin\theta}{r^2}$$

$$\Gamma = \pm B_{//}\ell \qquad \Gamma_{pf} = \mu_0 I_s$$

$$\Phi_m = B_\perp A \qquad \mathcal{E} = \frac{d\Phi_m}{dt}$$

$$\mathcal{E} = vB\ell$$

$$\Delta V_{2(eff)} = \frac{N_2}{N_1}\Delta V_{1(eff)}$$
$$I_{2(eff)} = \frac{N_1}{N_2}I_{1(eff)}$$

$$\Delta V_L = L\frac{dI}{dt} \qquad L = \frac{N\Phi_m}{I}$$
$$L = n^2\mu_0 A\ell$$

$$U = \frac{1}{2}LI^2 \qquad u_m = \frac{1}{2}\frac{B^2}{\mu_0}$$

$$\tau = \frac{L}{R} \qquad I = I_{max}(1 - e^{-t/\tau})$$
$$I = I_{max}e^{-t/\tau}$$

$$\omega = 2\pi f = \frac{2\pi}{T} \qquad \omega = \frac{1}{\sqrt{LC}}$$
$$\omega' = \sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

$$X = \frac{\Delta V_{max}}{I_{max}} \qquad Z = \frac{\Delta V_{max}}{I_{max}}$$
$$X_C = \frac{1}{\omega C} \qquad X_L = \omega L$$
$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$
$$\phi = \arctan\left(\frac{X_L - X_C}{R}\right)$$

$$g = 9{,}8\ \text{m/s}^2$$
$$G = 6{,}67\times10^{-11}\ \text{N·m}^2/\text{kg}^2$$
$$e = 1{,}6\times10^{-19}\ \text{C}$$
$$m_p \approx m_n \approx 1{,}67\times10^{-27}\ \text{kg}$$
$$m_e = 9{,}11\times10^{-31}\ \text{kg}$$
$$k = 9\times10^9\ \text{N·m}^2/\text{C}^2$$
$$\varepsilon_0 = \frac{1}{4\pi k} = 8{,}85\times10^{-12}\frac{\text{C}^2}{\text{N·m}^2}$$
$$1\ \text{D} = 3{,}34\times10^{-30}\ \text{C·m}$$
$$1\ \text{eV} = 1{,}6\times10^{-19}\ \text{J}$$
$$1\ \text{G} = 10^{-4}\ \text{T}$$
$$\mu_0 = 4\pi\times10^{-7}\ \text{T·m/A}$$

$$v_x = v_{x0} + a_x t$$
$$x = x_0 + v_{x0}t + \frac{1}{2}a_x t^2$$
$$v_x^2 = v_{x0}^2 + 2a_x(x - x_0)$$
$$T = \frac{2\pi r}{v} \qquad f = \frac{1}{T} \qquad a_C = \frac{v^2}{r}$$

$$\sum\vec{F} = m\vec{a} \qquad \vec{F}_g = m\vec{g}$$
$$F_g = \frac{Gm_1m_2}{r^2} \qquad g = \frac{Gm}{r^2}$$

$$W = \vec{F}\bullet\vec{s} \qquad K = \frac{1}{2}mv^2$$
$$U_g = mgy \qquad E = K + U$$
$$E_f = E_i + W_{nc} \qquad \Delta E = W_{nc}$$
$$Q = mc\Delta T \qquad P = \vec{F}\bullet\vec{v}$$

$$\vec{p} = m\vec{v}$$

$$\tau = \pm rF_\perp = \pm rF\sin\phi$$

$$\vec{A}\bullet\vec{B} = AB\cos\theta_{AB}$$
$$\vec{A}\bullet\vec{B} = A_xB_x + A_yB_y + A_zB_z$$
$$\|\vec{A}\times\vec{B}\| = AB\sin\theta_{AB}$$

$$\frac{d}{dx}\tan(Ax) = A\sec^2(Ax)$$
$$\int\frac{dx}{A^2 + x^2} = \frac{1}{A}\arctan\left(\frac{x}{A}\right) + C$$
$$\int\frac{x\,dx}{(A^2 + x^2)^{3/2}} = \frac{-1}{\sqrt{A^2 + x^2}} + C$$
$$\int\frac{dx}{(A^2 + x^2)^{3/2}} = \frac{x}{A^2\sqrt{A^2 + x^2}} + C$$