Équations importantes du tome 3

$$x = A\sin(\omega t + \phi) \qquad \omega = \frac{2\pi}{T}$$
$$v_{\max} = A\omega \qquad a_{\max} = A\omega^2$$
$$a_x = -\omega^2 x$$

$$\omega_0 = \sqrt{\frac{k}{m}} \qquad \omega_0 = \sqrt{\frac{g}{L}}$$

$$\theta = \theta_{\max}\sin(\omega t + \phi)$$
$$\omega_0 = \sqrt{\frac{mgh}{I}}$$
$$I = mh^2 + I_{\text{CM}}$$

$$U = \tfrac{1}{2}m\omega^2 x^2$$
$$E = \tfrac{1}{2}m\omega^2 A^2$$

$$\boldsymbol{F}_{\text{am}} = -b\vec{\boldsymbol{v}}$$
$$\omega' = \sqrt{\frac{k}{m} - \left(\frac{b}{2m}\right)^2}$$
$$x = A_0 e^{-\frac{b}{2m}t}\sin(\omega' t + \phi)$$

$$\lambda = vT = \frac{v}{f}$$
$$v_{\text{s}} = 340 \text{ m/s}$$
$$v = \sqrt{\frac{F}{\mu}} \qquad \mu = \frac{m}{L}$$

$$y = A\sin(kx \pm \omega t + \phi)$$
$$k = \frac{2\pi}{\lambda} \qquad \overline{P} = \tfrac{1}{2}\mu v\omega^2 A^2$$

$$C_{\text{R}} = \frac{A_{\text{R}}}{A_{\text{I}}} = \frac{1 - \sqrt{\mu_2/\mu_1}}{1 + \sqrt{\mu_2/\mu_1}}$$
$$C_{\text{T}} = \frac{A_{\text{T}}}{A_{\text{I}}} = \frac{2}{1 + \sqrt{\mu_2/\mu_1}}$$

$$f' = \left(\frac{v_{\text{s}\mathbf{R}}}{v_{\text{s}\mathbf{E}}}\right)f$$
$$f' = \left(\frac{v_{\text{s}} \pm v_{\mathbf{R}}}{v_{\text{s}} \pm v_{\mathbf{E}}}\right)f$$

$$y = A_{\text{stat}}\cos(\omega t)\sin(kx)$$

$$f_{\text{b}} = |f_1 - f_2|$$

$$I = \frac{P}{A} \qquad \beta = 10\log\left(\frac{I}{I_0}\right)$$
$$I_0 = 10^{-12} \text{ W/m}^2$$

$$g = \frac{y_{\text{i}}}{y_{\text{o}}} \qquad G = \frac{\alpha_{\text{i}}}{\alpha_{\text{o}}}$$

$$\theta' = \theta \qquad f = \frac{R}{2}$$
$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} \qquad \frac{y_{\text{i}}}{y_{\text{o}}} = -\frac{q}{p}$$

$$n = \frac{c}{v} \qquad n_2\sin\theta_2 = n_1\sin\theta_1$$

$$\frac{n_1}{p} + \frac{n_2}{q} = \frac{n_2 - n_1}{R}$$
$$\frac{y_{\text{i}}}{y_{\text{o}}} = -\frac{n_1}{n_2}\frac{q}{p}$$

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} \qquad \frac{y_{\text{i}}}{y_{\text{o}}} = -\frac{q}{p}$$
$$\frac{1}{f} = (n_{\text{L}} - 1)\left(\frac{1}{R_{\mathbf{A}}} - \frac{1}{R_{\mathbf{B}}}\right)$$

$$A_{\text{acc}} = V_{\max} - V_{\min}$$
$$V = \frac{1}{f} \qquad A_{\text{acc}} = \frac{1}{d_{\text{PP}}} - \frac{1}{d_{\text{PR}}}$$

$$\delta_{\max} = m\lambda \qquad \delta_{\min} = (m + \tfrac{1}{2})\lambda$$

$$\delta = d\sin\theta$$
$$\Delta\phi = \frac{\delta}{\lambda} \times (2\pi \text{ rad})$$
$$I_2 = 4I_1\cos^2\left(\frac{\Delta\phi}{2}\right)$$

$$\delta = a\sin\theta$$
$$\delta_{\min} = m\lambda$$
$$(m = \pm 1,\ \pm 2,\ \pm 3,\ \ldots)$$
$$\theta_{\text{lim}} = 1{,}22\frac{\lambda}{D}$$
$$I = I_0\frac{\sin^2(\Delta\phi_a/2)}{(\Delta\phi_a/2)^2}$$

$$\frac{\lambda'}{\lambda} = \frac{n}{n'}$$

$$I' = I\cos^2\theta$$

$$\gamma = \frac{1}{\sqrt{1 - (v/c)^2}}$$
$$\gamma \approx 1 + \frac{1}{2}\left(\frac{v}{c}\right)^2$$
$$T = \gamma T_0 \qquad L = \frac{L_0}{\gamma}$$

$$\tau = \frac{L_0}{c}\frac{v}{c}$$

$$x_{\mathbf{B}} = \gamma(x_{\mathbf{A}} - v_{x\mathbf{BA}}t_{\mathbf{A}})$$
$$t_{\mathbf{B}} = \gamma\left(t_{\mathbf{A}} - \frac{v_{x\mathbf{BA}}}{c^2}x_{\mathbf{A}}\right)$$

$$v_{x\mathbf{AR}} = \frac{v_{x\mathbf{AB}} + v_{x\mathbf{BR}}}{1 + \left(\frac{v_{x\mathbf{AB}}}{c}\right)\left(\frac{v_{x\mathbf{BR}}}{c}\right)}$$

$$f' = \sqrt{\frac{c \pm v}{c \mp v}}f$$

$$\vec{\boldsymbol{p}} = \gamma m\boldsymbol{v} \qquad F = \gamma^3 ma$$
$$K = (\gamma - 1)mc^2 \qquad E_0 = mc^2$$
$$E = E_0 + K = \gamma mc^2$$
$$E^2 = p^2c^2 + m^2c^4$$

$$E = hf \qquad E = pc$$

$$\lambda' - \lambda = \frac{h}{mc}(1 - \cos\theta)$$

$$\lambda_{\max} = \frac{(0{,}0029 \text{ m·K})}{T}$$
$$I = \sigma T^4$$

$$\lambda = h/p$$

$$\Delta p_x\,\Delta x > h \qquad \Delta E\,\Delta t > h$$

$$2\pi r = n\lambda \qquad E = \frac{(-13{,}6 \text{ eV})}{n^2}$$

$$E_{\text{L}} = \Delta m\,c^2$$
$$Q = (\textstyle\sum m_{\text{i}} - \sum m_{\text{f}})c^2$$

$$N = N_0 e^{-\lambda t}$$
$$T_{1/2} = \ln 2/\lambda \qquad R = \lambda N$$

$$L_{\text{S}} = 3{,}83 \times 10^{26} \text{ W}$$
$$\bar{D}_{\text{ST}} = 1{,}496 \times 10^{11} \text{ m}$$
$$S = 1{,}36 \text{ kW/m}^2$$
$$R_{\text{T}} = 6{,}37 \times 10^6 \text{ m}$$
$$\alpha = 0{,}3$$

$$T = 288 \text{ K} \qquad \text{EEI} = 1 \text{ W/m}^2$$

$$I_{\text{c}} = \kappa\left|\frac{\text{d}T}{\text{d}r}\right|$$

$$C = 0{,}128 \text{ ppm} \times \frac{m_{\text{CO}_2}}{1 \text{ Gt}}$$
$$C_{\text{pi}} = 280 \text{ ppm}$$
$$\Delta F_{\text{CO}_2} = (5{,}35 \text{ W/m}^2)\ln\left(\frac{C}{C_{\text{pi}}}\right)$$

Constantes et facteurs de conversion

$$g = 9{,}8 \text{ m/s}^2$$
$$e = 1{,}6 \times 10^{-19} \text{ C}$$
$$1 \text{ eV} = 1{,}6 \times 10^{-19} \text{J}$$
$$k = 9 \times 10^9 \text{ N·m}^2/\text{C}^2$$
$$c = 3{,}00 \times 10^8 \text{ m/s}$$
$$h = 6{,}63 \times 10^{-34} \text{ J·s}$$
$$T(\text{K}) = T(°\text{C}) + 273{,}15$$
$$\sigma = 5{,}67 \times 10^{-8} \text{ W/(m}^2\text{·K}^4\text{)}$$
$$1 \text{ u} = 1{,}660\ 539 \times 10^{-27} \text{kg}$$
$$m_{\text{p}} = 1{,}007\ 276 \text{ u}$$
$$m_{\text{n}} = 1{,}008\ 665 \text{ u}$$
$$m_{\text{e}} = 9{,}11 \times 10^{-31} \text{kg}$$
$$= 0{,}000\ 549 \text{ u}$$
$$1\,\frac{\text{MeV}}{c^2} = 1{,}782\ 662 \times 10^{-30} \text{kg}$$
$$1 \text{ u} = 931{,}5 \text{ MeV}/c^2$$

Rappels des tomes A et B

$$v_x = \frac{\text{d}x}{\text{d}t} \qquad a_x = \frac{\text{d}v_x}{\text{d}t}$$
$$a_{\text{C}} = \frac{v^2}{r} \qquad f = \frac{1}{T}$$
$$\textstyle\sum \vec{\boldsymbol{F}} = m\vec{\boldsymbol{a}} \qquad F_{\text{r}} = k|e|$$
$$K_{\text{f}} + U_{\text{f}} = K_{\text{i}} + U_{\text{i}} + W_{\text{nc}}$$
$$W = Fs\cos\theta_{Fs} \qquad K = \tfrac{1}{2}mv^2$$
$$U_{\text{r}} = \tfrac{1}{2}ke^2 \qquad U_{\text{g}} = mgy$$
$$E = K + U \qquad \overline{P} = \frac{\Delta(\text{énergie})}{\Delta t}$$
$$\vec{\boldsymbol{p}} = m\vec{\boldsymbol{v}} \qquad \textstyle\sum \vec{\boldsymbol{p}}_{\text{f}} = \sum \vec{\boldsymbol{p}}_{\text{i}}$$
$$U_{\text{e}} = qV$$