Équations importantes du tome 3

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

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

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

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

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

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

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

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

$$f' = \left(\frac{v_{\mathrm{sR}}}{v_{\mathrm{sE}}}\right)f$$
$$f' = \left(\frac{v_{\mathrm{s}} \pm v_{\mathrm{R}}}{v_{\mathrm{s}} \pm v_{\mathrm{E}}}\right)f$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\lambda = h/p$$

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

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

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

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

$$L_{\mathrm{S}} = 3{,}83\times10^{26}\ \mathrm{W}$$
$$\bar{D}_{\mathrm{ST}} = 1{,}496\times10^{11}\ \mathrm{m}$$
$$S = 1{,}36\ \mathrm{kW/m^2}$$
$$R_{\mathrm{T}} = 6{,}37\times10^{6}\ \mathrm{m}$$
$$\alpha = 0{,}3$$

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

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

$$C = 0{,}128\ \mathrm{ppm} \times \frac{m_{\mathrm{CO_2}}}{1\ \mathrm{Gt}}$$
$$C_{\mathrm{pi}} = 280\ \mathrm{ppm}$$
$$\Delta F_{\mathrm{CO_2}} = (5{,}35\ \mathrm{W/m^2})\ln\left(\frac{C}{C_{\mathrm{pi}}}\right)$$

$$g = 9{,}8\ \mathrm{m/s^2}$$
$$e = 1{,}6\times10^{-19}\ \mathrm{C}$$
$$1\ \mathrm{eV} = 1{,}6\times10^{-19}\mathrm{J}$$
$$k = 9\times10^{9}\ \mathrm{N\cdot m^2/C^2}$$
$$c = 3{,}00\times10^{8}\ \mathrm{m/s}$$
$$h = 6{,}63\times10^{-34}\ \mathrm{J\cdot s}$$
$$T(\mathrm{K}) = T(^\circ\mathrm{C}) + 273{,}15$$
$$\sigma = 5{,}67\times10^{-8}\ \mathrm{W/(m^2\cdot K^4)}$$
$$1\ \mathrm{u} = 1{,}660\ 539\times10^{-27}\mathrm{kg}$$
$$m_{\mathrm{p}} = 1{,}007\ 276\ \mathrm{u}$$
$$m_{\mathrm{n}} = 1{,}008\ 665\ \mathrm{u}$$
$$m_{\mathrm{e}} = 9{,}11\times10^{-31}\mathrm{kg}$$
$$= 0{,}000\ 549\ \mathrm{u}$$
$$1\ \frac{\mathrm{MeV}}{c^2} = 1{,}782\ 662\times10^{-30}\mathrm{kg}$$
$$1\ \mathrm{u} = 931{,}5\ \mathrm{MeV}/c^2$$

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