

Tome 1, Mécanique	
<i>Chapitre 2</i>	
2.1	$A_x = A \cos \theta_A$
	$A_y = A \sin \theta_A$
2.2	$A = \sqrt{A_x^2 + A_y^2}$
2.3	$\tan \theta_A = \frac{A_y}{A_x}$
2.8	$A = \sqrt{A_x^2 + A_y^2 + A_z^2}$
2.9	$\vec{A} \cdot \vec{B} = AB \cos(\theta)$
2.11	$\vec{A} \times \vec{B} = A_x B_x + A_y B_y + A_z B_z$
2.12	$\vec{A} \times \vec{B} = AB \sin(\theta) \vec{u}_n$
2.13	$\vec{A} \times \vec{B} = C_x \vec{i} + C_y \vec{j} + C_z \vec{k}$ $= \left(A_y B_z - A_z B_y \right) \vec{i} +$ $\left(A_z B_x - A_x B_z \right) \vec{j} +$ $\left(A_x B_y - A_y B_x \right) \vec{k}$
<i>Chapitre 3</i>	
3.2	vitesse scalaire moyenne = $\frac{\text{distance parcourue}}{\text{intervalle de temps}}$
3.3	$v_{x_{\text{moy}}} = \frac{\Delta x}{\Delta t} = \frac{x_f - x_i}{t_f - t_i}$
3.5	$v_x = \frac{dx}{dt}$
3.6	$a_{x_{\text{moy}}} = \frac{\Delta v_x}{\Delta t}$
3.7	$a_x = \frac{dv_x}{dt}$
3.9	$v_x = v_{x0} + a_x t$
3.10	$x = x_0 + \frac{1}{2}(v_{x0} + v_x)t$
3.11	$x = x_0 + v_{x0}t + \frac{1}{2}a_x t^2$
3.12	$v_x^2 = v_{x0}^2 + 2a_x(x - x_0)$
3.13	$v_y = v_{y0} - gt$
3.14	$y = y_0 + \frac{1}{2}(v_{y0} + v_y)t$
3.15	$y = y_0 + v_{y0}t - \frac{1}{2}gt^2$
3.16	$v_y^2 = v_{y0}^2 - 2g(y - y_0)$
<i>Chapitre 4</i>	
4.3	$\vec{v}_{\text{moy}} = \frac{\Delta \vec{r}}{\Delta t} = \frac{\Delta x}{\Delta t} \vec{i} + \frac{\Delta y}{\Delta t} \vec{j} + \frac{\Delta z}{\Delta t} \vec{k}$
4.9	$x = v_{x0}t$
4.10	$v_y = v_{y0} - gt$
4.11	$y = y_0 + v_{y0}t - \frac{1}{2}gt^2$
4.12	$v_y^2 = v_{y0}^2 - 2g(y - y_0)$
4.13	$a_r = \frac{v^2}{r}$
4.14	$T = \frac{2\pi r}{v}$
4.16	$\vec{v}_{PA} = \vec{v}_{PB} + \vec{v}_{BA}$
<i>Chapitre 5</i>	
5.1	$F_{\text{res}} = k\Delta\ell$
5.2	$\sum \vec{F} = m\vec{a}$
5.3	$\sum F_x = ma_x \quad \sum F_y = ma_y \quad \sum F_z = ma_z$
5.4	$F_g = \frac{GMm}{r^2}$
<i>Chapitre 6</i>	
6.1	$f_c = \mu_c N$
6.2	$f_{s(\text{max})} = \mu_s N$
6.3	$\sum F_x = \frac{mv^2}{r}$
<i>Chapitre 7</i>	
7.1a	$W = F \cos(\theta)$
7.1c	$W = F_x \Delta x + F_y \Delta y + F_z \Delta z$
7.7	$W_{\text{res}} = -\frac{k}{2}(x_f^2 - x_i^2)$
7.11	$K = \frac{1}{2}mv^2$
7.12	$\sum W = \Delta K$
7.13	$P_{\text{moy}} = \frac{\Delta W}{\Delta t}$
7.15a	$P = \vec{F} \cdot \vec{v}$
<i>Chapitre 8</i>	
8.6a	$U_g = mgy$
8.7a	$U_{\text{res}} = \frac{1}{2}kx^2$
8.8a	$K_f + U_f = K_i + U_i$
8.9	$E = K + U$
8.10	$E_i = E_f \quad \Delta E = 0$
8.16b	$\Delta K + \Delta U = W_{\text{nc}}$
8.16c	$\Delta E = E_f - E_i = W_{\text{nc}}$
8.19	$U_g = -\frac{GmM}{r}$
8.20	$E = \frac{1}{2}mv^2 - \frac{GmM}{r}$
8.21	$E = -\frac{GmM}{2r}$
8.22	$v_{\text{lib}} = \sqrt{\frac{2GM_T}{R_T}}$
<i>Chapitre 9</i>	
9.1	$\vec{p} = mv$
9.6a	$m_1 \vec{u}_1 + m_2 \vec{u}_2 = m_1 \vec{v}_1 + m_2 \vec{v}_2$
9.6b	$m_1 u_{1x} + m_2 u_{2x} = m_1 v_{1x} + m_2 v_{2x}$ $m_1 u_{1y} + m_2 u_{2y} = m_1 v_{1y} + m_2 v_{2y}$ $m_1 u_{1z} + m_2 u_{2z} = m_1 v_{1z} + m_2 v_{2z}$
9.7	$\frac{1}{2}m_1 u_1^2 + \frac{1}{2}m_2 u_2^2 = \frac{1}{2}m_1 v_1^2 + \frac{1}{2}m_2 v_2^2$
9.10	$v_{2x} - v_{1x} = -(u_{2x} - u_{1x})$
9.14	$\vec{I} = \Delta \vec{p} = \vec{p}_f - \vec{p}_i$
9.15	$\vec{I} = \Delta \vec{p} = \vec{F}_{\text{moy}} \Delta t$
<i>Chapitre 10</i>	
10.1	$\vec{r}_{\text{CM}} = \frac{\sum m_i \vec{r}_i}{M}$
10.2	$x_{\text{CM}} = \frac{\sum m_i x_i}{M}; \quad y_{\text{CM}} = \frac{\sum m_i y_i}{M}; \quad z_{\text{CM}} = \frac{\sum m_i z_i}{M}$
10.4	$\vec{v}_{\text{CM}} = \frac{\sum m_i \vec{v}_i}{M}$
10.5a	$\vec{P} = M \vec{v}_{\text{CM}}$
10.6	$\sum \vec{F}_{\text{EXT}} = M \vec{a}_{\text{CM}}$
<i>Chapitre 11</i>	
11.1	$\Delta \theta = \frac{s}{r}$
11.2	$\omega_{\text{moy}} = \frac{\Delta \theta}{\Delta t} = \frac{\theta_f - \theta_i}{t_f - t_i}$
11.3	$\omega = \lim_{\Delta t \rightarrow 0} \frac{\Delta \theta}{\Delta t} = \frac{d\theta}{dt}$
11.4	$\omega = \frac{2\pi}{T} = 2\pi f$
11.6	$\omega_0 + \alpha t$
11.7	$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2$
11.8	$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$
11.9	$v_t = \omega r$
11.10	$a_r = \frac{v^2}{r} = \omega^2 r$
11.11	$a_t = \frac{v^2}{r} = \frac{1}{2}\alpha r^2$
11.12	$E = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv^2 + \frac{1}{2}kA^2 \sin^2(\omega t + \phi)$
11.13	$E = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv^2 + \frac{1}{2}kA^2 \cos^2(\omega t + \phi)$
11.15a	$\omega = \sqrt{\frac{g}{L}}$
11.16	$\theta = \theta_0 \sin(\omega t + \phi)$
<i>Chapitre 12</i>	
12.1	$\sum \vec{F} = 0$
12.2	$\sum F_x = 0; \quad \sum F_y = 0$
12.3	$\sum \tau = 0$
12.10	$\vec{I} = \vec{r} \times \vec{p}$
<i>Chapitre 13</i>	
13.2	$F_g = \frac{Gm_1 m_2}{r^2}$
13.8	$E = -\frac{GmM}{2a}$
<i>Chapitre 14</i>	
14.1	$\rho = \frac{m}{V}$
14.3	$\rho_{\text{moy}} = \frac{\sum m_i}{\sum V_i}$
14.4	$\sigma = \frac{\Delta m}{\Delta V} = \frac{\theta_f - \theta_i}{T_f - T_i}$
14.5	$E = \frac{1}{2}mv^2 = \frac{1}{2}mv^2 = \frac{1}{2}m\omega^2 r^2$
14.6	$a_r = \frac{v^2}{r} = \frac{1}{2}\omega^2 r^2$
14.7	$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$
14.8	$v_t = \omega r$
14.9	$\omega = \frac{2\pi}{T} = 2\pi f$
14.10	$a_r = \frac{v^2}{r} = \omega^2 r$
14.11	$a_t = \frac{v^2}{r} = \frac{1}{2}\alpha r^2$
14.12	$E = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv^2 + \frac{1}{2}kA^2 \sin^2(\omega t + \phi)$
14.13	$E = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv^2 + \frac{1}{2}kA^2 \cos^2(\omega t + \phi)$
14.15a	$\omega = \sqrt{\frac{g}{L}}$
14.16	$\theta = \theta_0 \sin(\omega t + \phi)$
<i>Chapitre 15</i>	
15.1	$\omega = \frac{2\pi}{T} = 2\pi f$
15.2	$v(t) = A \sin(\omega t + \phi)$
15.3	$v_x = \frac{dv}{dt} = \omega A \cos(\omega t + \phi)$
15.4	$a_x = \frac{d^2v}{dt^2} = -\omega^2 A \sin(\omega t + \phi)$
15.5	$\ddot{x} = -\omega^2 x$
15.6	$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$
15.7	$\theta = \theta_0 \sin(\omega t + \phi)$
15.8	$\omega = \frac{2\pi}{T} = 2\pi f$
15.9	$a_r = \frac{v^2}{r} = \omega^2 r$
15.10	$a_t = \frac{v^2}{r} = \frac{1}{2}\alpha r^2$
15.11	$E = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv^2 + \frac{1}{2}kA^2 \sin^2(\omega t + \phi)$
15.12	$E = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv^2 + \frac{1}{2}kA^2 \cos^2(\omega t + \phi)$
15.14a	$\omega = \sqrt{\frac{g}{L}}$
15.15	$\theta = \theta_0 \sin(\omega t + \phi)$
<i>Chapitre 16</i>	
16.1	$PV = nRT$
16.2	$\Delta L = \alpha L \Delta T$
16.3	$\Delta Q = \kappa A \Delta T$
16.4	$\Delta Q = \kappa A \Delta T$
16.5	$\Delta Q = \kappa A \Delta T$
16.6	$\Delta Q = \kappa A \Delta T$
16.7	$\Delta Q = \kappa A \Delta T$
16.8	$\Delta Q = \kappa A \Delta T$
16.9	$\Delta Q = \kappa A \Delta T$
16.10	$\Delta Q = \kappa A \Delta T$
16.11	$\Delta Q = \kappa A \Delta T$
16.12	$\Delta Q = \kappa A \Delta T$
16.13	$\Delta Q = \kappa A \Delta T$
16.14	$\Delta Q = \kappa A \Delta T$
16.15	$\Delta Q = \kappa A \Delta T$
16.16	$\Delta Q = \kappa A \Delta T$
16.17	$\Delta Q = \kappa A \Delta T$
16.18	$\Delta Q = \kappa A \Delta T$
16.19	$\Delta Q = \kappa A \Delta T$
16.20	$\Delta Q = \kappa A \Delta T$
16.21	$\Delta Q = \kappa A \Delta T$
16.22	$\Delta Q = \kappa A \Delta T$
<i>Chapitre 17</i>	
17.1	$\Delta Q = mc \Delta T$
17.2	$\Delta Q = nC_V \Delta T$
17.3	$\Delta Q = nC_V \Delta T$
17.4	$\Delta Q = nC_V \Delta T$
17.5	$\Delta Q = nC_V \Delta T$
17.6	$\Delta Q = nC_V \Delta T$
17.7	$\Delta Q = nC_V \Delta T$
17.8	$\Delta Q = nC_V \Delta T$
17.9	$\Delta Q = nC_V \Delta T$
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17.14	$\Delta Q = nC_V \Delta T$
17.15	$\Delta Q = nC_V \Delta T$
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17.19	$\Delta Q = nC_V \Delta T$
17.20	$\Delta Q = nC_V \Delta T$
17.21	$\Delta Q = nC_V \Delta T$
17.22	$\Delta Q = nC_V \Delta T$
<i>Chapitre 18</i>	
18.1	$C_V = \frac{3}{2}k$
18.2	$C_p = \frac{5}{2}k$
18.3	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.4	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.5	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.6	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.7	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.8	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.9	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.10	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.11	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.12	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.13	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.14	$\lambda = \frac{C_p - C_V}{T_f - T_i}$
18.15	$\lambda =$