$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1,\quad \vec{r}(t)=x(t)\hat{i}+y(t)\hat{j}+z(t)\hat{k},\quad r^2=x^2+y^2+z^2,$$

$$x(t)=u(t)v(t),\quad x'(t)=\frac{du}{dt}v+u\frac{dv}{dt},\quad \vec{a}'=\vec{a}-2\vec{\omega}\times\vec{V}'-\vec{\omega}\times(\vec{\omega}\times\vec{R})$$

$$\vec{F}=m\frac{d^2\vec{r}}{dt^2}=\frac{d\vec{P}}{dt}=m\frac{d\vec{V}}{dt},\quad F_N=ma_N=m\frac{V^2}{R},\quad \vec{F}(\vec{r})=-k\vec{r},\quad \vec{F}=m\ddot{\vec{r}}=-m\omega^2\vec{r},$$

$$\omega=2\pi f=\frac{2\pi}{T}=\sqrt{\frac{k}{m}},\quad V=\omega R,\quad \vec{r}(t)=\vec{V}t+\vec{r}_o,\quad \vec{p}=m\vec{V},\quad F_{\tau\rho\iota\beta\acute{\eta}}=\mu N$$

$$I=\Omega=\int_{t_1}^{t_2}Fdt=\Delta P=m(u_2-u_1),\quad \vec{F}=m\frac{d\vec{v}}{dt}+\frac{dm}{dt}(\vec{v}-\vec{v}_o),\quad \frac{m_i}{m_f}=e^{\frac{(v_f-v_i)}{u}}$$

$$dW=\vec{F}d\vec{s},\quad N=\frac{dW}{dt}=\vec{F}\vec{u},\quad \vec{F}=-\text{grad}E_p=-\left(\frac{\partial E_p}{\partial x}\hat{i}+\frac{\partial E_p}{\partial y}\hat{j}+\frac{\partial E_p}{\partial z}\hat{k}\right)$$

$$\frac{d^2x}{dt^2}+\omega^2x=0,\ x=A\cos\omega t,\ T=2\pi\sqrt{\frac{m}{k}},\quad m\frac{d^2x}{dt^2}+\lambda\frac{dx}{dt}+kx=0,$$

$$x=A_oe^{-\gamma t}\cos(\omega t+\phi),\ \gamma=\lambda/2m,\quad \vec{F}=-G\frac{mM}{r^2}\hat{r},\ |\hat{r}|=1,\quad \hat{r}=\frac{\vec{r}}{r},\quad \vec{r}_c=\frac{\int_M\vec{r}dm}{\int_M dm},$$

$$I=\int_M r^2dm,\quad I=I_c+mr^2,\ L_{cyc}=mr^2\omega,\quad \vec{L}=I\vec{\omega},\quad \vec{\tau}=\frac{d\vec{L}}{dt}=I\frac{d\vec{\omega}}{dt},\ E_{kin,rot}=\frac{1}{2}I\omega^2$$

$$\beta=\frac{V}{c},\quad \gamma=\frac{1}{\sqrt{1-\frac{V^2}{c^2}}},\quad E=\gamma mc^2=K+E_0,\quad E_0=mc^2,\quad p=\gamma mV$$

(Κίνηση άξονα x):

$$x'=\gamma(x-V\cdot t),\ t'=\gamma(t-\frac{V\cdot x}{c^2}),\ u'_x=\frac{u_x-V}{1-\frac{u_xV}{c^2}},\ u'_{y\,\acute{\eta}z}=\frac{u_{y\,\acute{\eta}z}}{\gamma\left(1-\frac{u_xV}{c^2}\right)}$$

$$F_{\alpha\nu}=S\rho_{\upsilon\gamma\rho}gh\qquad P+\frac{1}{2}\rho u^2+\rho gh=C,\quad A_1v_1=A_2v_2$$

$g=9.81\,m/s^2$, $c=3\times10^8\,m/s$, $G=6.67\times10^{-11}\,Nm^2/Kg^2$, $S_{sphere}=4\pi R^2$, $V_{sphere}=(4/3)\pi R^3$