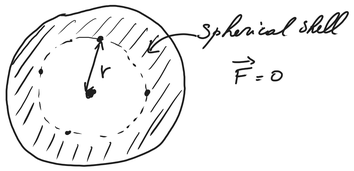
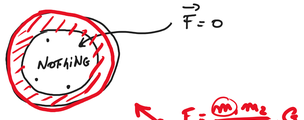
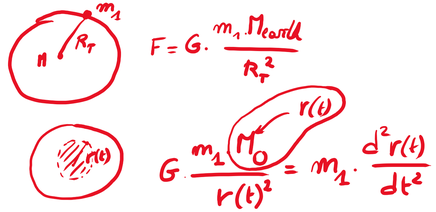
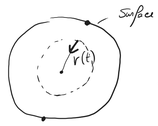








$$-G\frac{\left(\frac{4\pi}{3}\cdot\rho(t)\cdot\rho\right)\cdot m_1}{r^2(t)} = m_1\cdot\frac{d^2r(t)}{dt^2}$$

(Mass inside)

$$\frac{d^2r(t)}{dt^2} = -\frac{4\pi}{3}\cdot\rho\cdot G\cdot r(t)$$

CONSTANT $\cdot \frac{g}{R_T}$

$$\frac{d^2r(t)}{dt^2} = -\frac{g}{R_T}\cdot r(t) \quad \checkmark$$

$$r(t) = A\cos(\omega t + \varphi)$$

$$\frac{4\pi}{3}\cdot M_{earth}\cdot G = \frac{g}{R_T}$$

$\frac{M_{earth}\cdot G}{R_T^2}$

ease notations

$$\frac{4\pi}{3}\cdot\frac{M_{earth}}{\frac{4\pi}{3}\cdot R_T^3}\cdot G = \frac{g}{R_T}$$

$$\frac{d^2\theta(t)}{dt^2} = -\frac{g}{L}\cdot\theta(t)$$

PENDULUM (*)

$$\frac{d^2x(t)}{dt^2} = -\frac{k}{m}\cdot x(t)$$

SPRING (**)

$$\begin{cases} r(t=0) = R_T \\ \left.\frac{dr}{dt}\right|_{t=0} = 0 \end{cases}$$

$r(t) = A\cos(\omega t + \varphi)$

[m] [m] [T^{-1}] [-]

unit unit unit

$$+A\omega^2\cos(\omega t+\varphi) = A\frac{g}{R_T}\cdot\cos(\omega t+\varphi)$$

$$\omega^2 = \frac{g}{R_T}$$

$$\omega \overset{?}{=} \sqrt{\frac{g}{R_T}} \quad \checkmark$$

$A = R_T$

$\varphi = 0$

$$\omega \overset{?}{=} 0.00124\ [s^{-1}]$$

$$T \overset{?}{=} 5063\ s = 84\ min = 1h24\ min$$

$$\frac{T}{2} = \boxed{42\ min}$$

(40 km)

(20.000 km)

New technology

free.

average ~ 850 km/h

600 km/h

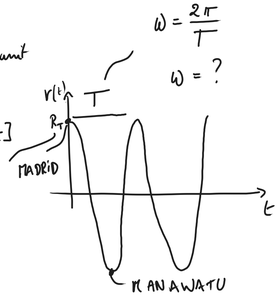
42 min.

$\frac{20000\ km}{850\ \frac{km}{h}} \simeq 23h30$

Plane time

$\omega = \frac{2\pi}{T}$

$\omega = ?$



$\cos(2\pi\cdot t)$ — T

$\cos\left(\frac{2\pi}{T}\cdot t\right)$ — ω (Angular velocity)

$\omega = \frac{2\pi}{T}$