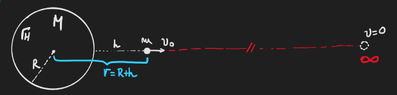
Πα 5-3-2021

B+2

Ταχύτητα Διαφυγής από ύψος h

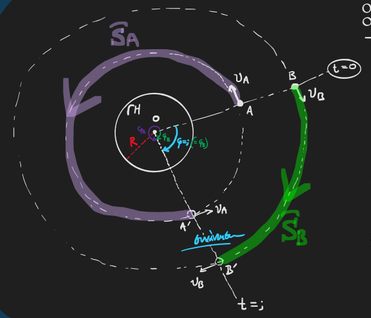


ΑΔΜΕ: $E_{αρχ}=E_{τελ} \Rightarrow K_r+U_r=K_\infty+U_\infty \Rightarrow$

$\Rightarrow \frac{1}{2}m\upsilon_0^2-G\frac{Mm}{r}=0 \Rightarrow \frac{1}{2}m\upsilon_0^2=G\frac{Mm}{r} \Rightarrow$

$\Rightarrow \upsilon_0^2=\frac{2GM}{r} \Rightarrow \boxed{\upsilon_0=\sqrt{\frac{2GM}{r}}} \rightsquigarrow \boxed{\upsilon_0=\sqrt{\frac{2GM}{R+h}}}$

Επιφάνεια: $h=R$ | $\upsilon_0=\sqrt{\frac{2GM}{R+R}}=\sqrt{\frac{2GM}{2R}}=\sqrt{\frac{GM}{R}}=8000\,m/s$ ή $8\,km/s$



$OA=2R=r_A$

$OB=3R=r_B$

$\Sigma F=F_K \Rightarrow G\frac{Mm}{r^2}=m\frac{\upsilon^2}{r} \Rightarrow \boxed{\upsilon=\sqrt{\frac{GM}{r}}}$ (Ταχύτητα δορυφορικής τροχιάς).

$\left.\begin{aligned}\upsilon_A&=\sqrt{\frac{GM}{2R}}\\ \upsilon_B&=\sqrt{\frac{GM}{3R}}\end{aligned}\right\} \div \Rightarrow \frac{\upsilon_A}{\upsilon_B}=\sqrt{\frac{\frac{GM}{2R}}{\frac{GM}{3R}}} \Rightarrow \boxed{\frac{\upsilon_A}{\upsilon_B}=\sqrt{\frac{3}{2}}}$

$\varphi_A+\varphi_B=2\pi \Rightarrow \omega_A t+\omega_B t=2\pi \Rightarrow \frac{\upsilon_A}{r_A}\cdot t+\frac{\upsilon_B}{r_B}t=2\pi \Rightarrow \frac{\upsilon_A}{2R}t+\frac{\upsilon_B}{3R}t=2\pi \Rightarrow$

$\upsilon=\omega r \Rightarrow \omega=\frac{\upsilon}{r}$

$\Rightarrow \frac{1}{2R}\cdot\sqrt{\frac{GM}{2R}}t+\frac{1}{3R}\sqrt{\frac{GM}{3R}}t=2\pi \Rightarrow$

$\Rightarrow \frac{1}{R}\sqrt{\frac{GM}{R}}\left(\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)t=2\pi \Rightarrow$

$\Rightarrow \sqrt{\frac{GM}{R^3}}\,\frac{3\sqrt{3}+2\sqrt{2}}{6\sqrt{6}}t=2\pi \Rightarrow$

$\Rightarrow \boxed{t=\frac{12\pi\sqrt{6}}{3\sqrt{3}+2\sqrt{2}}\sqrt{\frac{R^3}{GM}}}$

$\varphi=\varphi_B=\omega_B t=\frac{\upsilon_B}{r_B}t=\frac{\sqrt{\frac{GM}{3R}}}{3R}t=\frac{1}{3R}\sqrt{\frac{GM}{3R}}t=\sqrt{\frac{GM}{27R^3}}\cdot\frac{12\pi\sqrt{6}}{3\sqrt{3}+2\sqrt{2}}\sqrt{\frac{R^3}{GM}}=$

$=\frac{1}{\sqrt{27}}\frac{12\pi\sqrt{6}}{3\sqrt{3}+2\sqrt{2}}=\frac{1}{3\sqrt{3}}\frac{4\cdot 12\pi\sqrt{6}}{3\sqrt{3}+2\sqrt{2}}=\boxed{\frac{4\pi\sqrt{6}}{9+2\sqrt{6}}\ rad}$

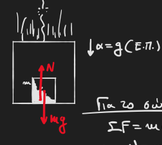
Συνθήκη Έλλειψης Βαρύτητας

Πάρα πολύ Μακριά (Στο άπειρο)

$F=G\frac{M\cdot m}{r^2}\rightarrow 0$

$(r\rightarrow\infty)$

Εδάφη Πλάνου 6ε Απόσταση



Για το σώμα

$\Sigma F=m\alpha \Rightarrow$

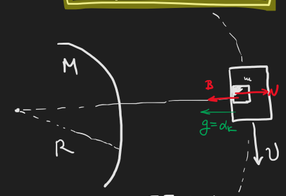
$mg-N=m\alpha \Rightarrow$

$mg-m\alpha=N \Rightarrow$

$N=m(g-\alpha) \xrightarrow{\alpha=g} N=0$

"φαίνεται" διότι το σώμα να κατρέσει

Δορυφορική Τροχιά



$\Sigma F=m\cdot a_K$

$B-N=m\cdot a_K$

$mg-ma_K=N$

$N=m(g-a_K) \xrightarrow{g=a_K} N=0$

(ικανοποίηση)