1

Zaporedje posnetkov Zemlje je naredila vesoljska sonda, ki se je gibala okoli Lune po krožni orbiti. Oceni višino sonde nad površjem Lune, če veš, da je med zaporednima posnetkoma minilo 8 sekund. Predpostavi, da je masa Lune 81-krat manjša od mase Zemlje, polmer Lune pa 4-krat manjši od Zemljinega.

Rešitve:

$t = 8$

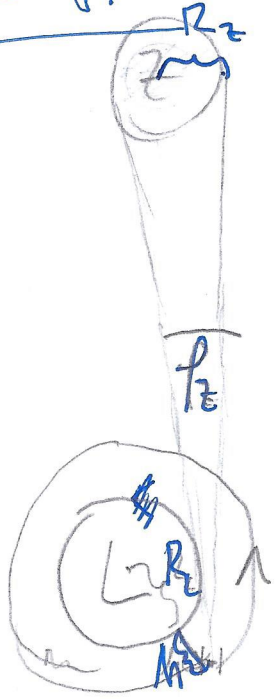
$R_L = \frac{R_Z}{4}$

$M_L = \frac{M_Z}{81}$

$\mu =$

$\varphi_L \approx 0{,}5^\circ$ $\quad R_Z = 4R_L \rightarrow \varphi_Z = 4\varphi_L$

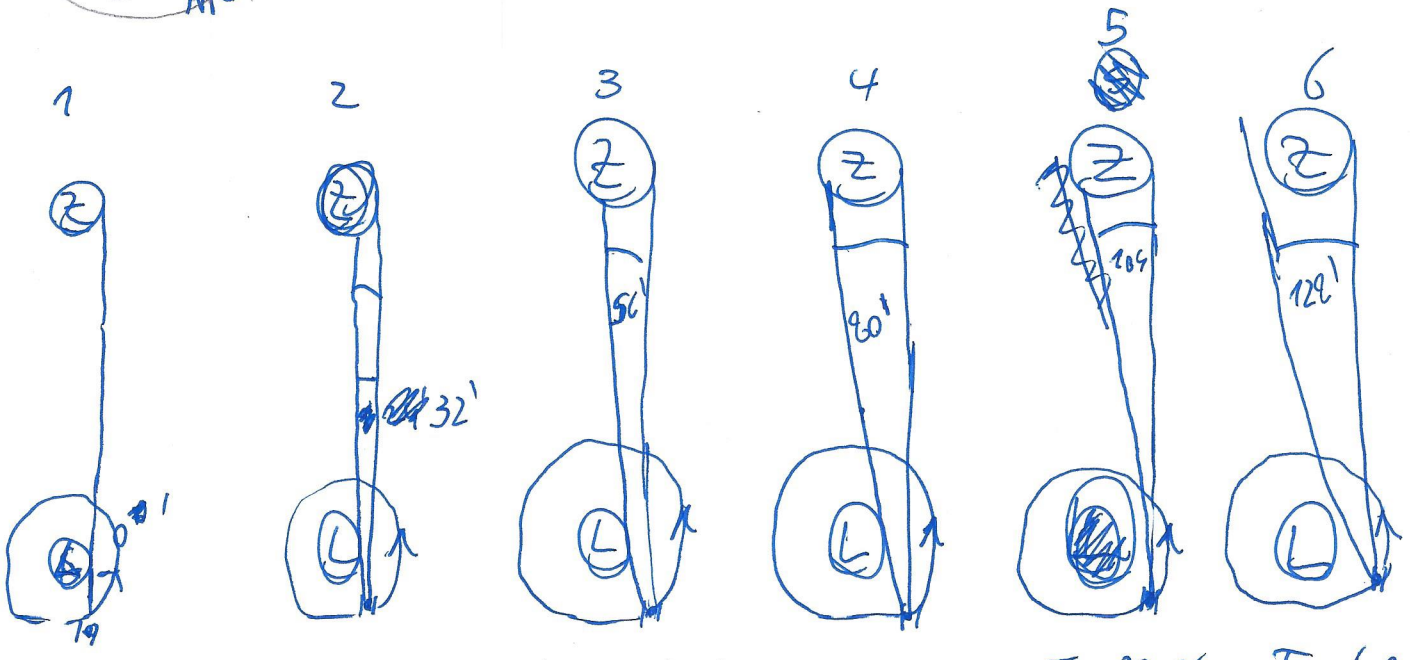
$\varphi_Z = 4 \cdot 0{,}5^\circ$ $\quad \varphi_Z \approx 2^\circ$



$\Delta\alpha = 24'$

$\omega_S = \frac{\Delta\alpha}{t}$

$\omega_S = \frac{24'}{8s}$ $\quad \omega_S = 3'/s$



$T = 0N$ $\quad T = 8N$ $\quad T = 16N$ $\quad T = 24N$ $\quad T = 32N$ $\quad T = 40N$

2

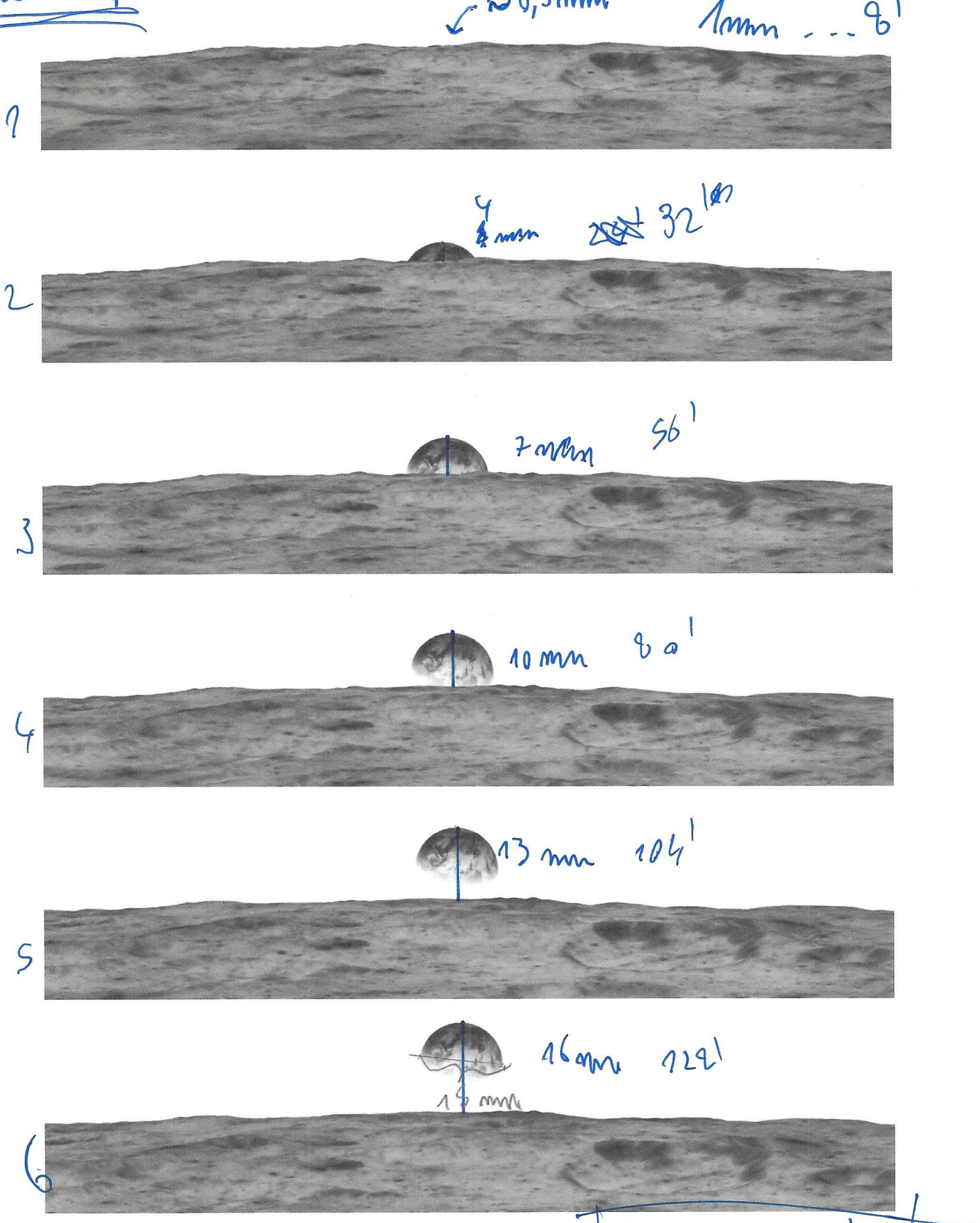
$\Delta\alpha = \alpha_3 - \alpha_2 = \alpha_4 - \alpha_3 = \alpha_5 - \alpha_4 = \alpha_6 - \alpha_5$

$\Delta\alpha = 56' - 32'$

$\Delta\alpha = 24'$

KER TEREN NI RAVEN JE NAJBRŽE

1mm ... 8'



$\varphi_z = 2°$

$D_z = 15mm$

1mm ..... 8'

120' : 15 = 8

23

$t_0 = \frac{360°}{\omega}$

$7200 : 60 = 120$

$t_0 = \frac{360° \cdot 60 \cdot 20}{3}$

$t_0 = 7200\,s = 120\,min = 2\,h$

$\frac{a_s^3}{t_0^2} = \frac{G m_z}{4\pi^2}$

$\frac{(R_z + h)^3}{t_0^2} = \frac{G \cdot m_z}{4 \cdot \pi^2}$ (≈ 40)

$\frac{(R_z + h)^3}{7200^2} = \frac{6{,}67 \cdot 10^{-11} \cdot 6 \cdot 10^{24}}{40}$

$\frac{(R_z + h)^3}{7200^2} = \frac{40 \cdot 10^{13}}{40}$

$(R_z + h)^3 = 10^{13} \cdot 7200^2$

$(R_z + h)^3 = 4 \cdot 10^4 \cdot 10^{13} \cdot 64$

$(R_z + h)^3 = 64 \cdot 10^{17}$

$R_z + h = \sqrt[3]{64 \cdot 10^{17}}$

$R_z + h = 4\sqrt[3]{10^{17}}$

$R_z + h = 4 \cdot 10^5 \sqrt[3]{10^2}$

$R_z + h = 18{,}1 \cdot 10^5\,m$

$4^3 = 64$

$5^3 = 125$

$4{,}5^3 = 91{,}125$

$4{,}65^3 = 97{,}336$

$\sqrt[3]{100} \approx 4{,}65$

4)

$R_c + h = 18{,}6 \cdot 10^5\ m$ $\qquad R_c \approx 1700000\ m$

$h = 18{,}6 \cdot 10^5\ m - R_c$

$h = 18{,}6 \cdot 10^5 - 17 \cdot 10^5\ m$

$h = 1{,}6 \cdot 10^5\ m$

$h = 160000\ m = 160\ km$

5

ČE UPOŠTEVAMO DA SE LUNA PREMIKA

2

$t_L = 27{,}3\ \text{dni} = 655{,}2\ \text{h}$

$27{,}3 \cdot 24$

546
+ 1092
655,2

$$\omega_L = \frac{360^\circ}{t_L}$$

$$\omega_L = \frac{360^\circ \cdot 60' }{655{,}2\ \text{h}}$$

$$\omega_L = \frac{360 \cdot 30}{327{,}6} = \frac{5 \cdot 60}{27{,}3} = \frac{300}{9{,}1}$$

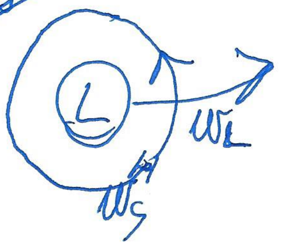
$$\omega_L = \frac{300}{9{,}1} \approx 32{,}95'/\text{h}$$

$0{,}549''/\text{s}$

6552 : 2 = 3276
05
15
12

819 : 3 = 273
21
09

273 : 3 = 91
03



270
− 18,2
8,8

300 : 91 = 32,95
270
880
610
65

5 · 91
545

$\ell = \omega_L \cdot t_0$

$\ell = 32{,}95'/\text{h} \cdot 2\ \text{h}$

$\ell = 65{,}9'$

0,549 · 40
21,960

7200 : 40 = 180
320
00

32,95 : 60 = 0,549

0,549 : 60 = 0,00915

$t_S = 9\ \text{s}$ $\quad \ell = \omega_L \cdot t_S$

$t_S = 40\ \text{s}$ $\quad \ell = 0{,}549''/\text{s} \cdot 40\ \text{s}$

$\ell = 21{,}96''$

$\ell \ll 1{,}28'$ $\quad \ell$ LAHKO ZANEMARIMO