

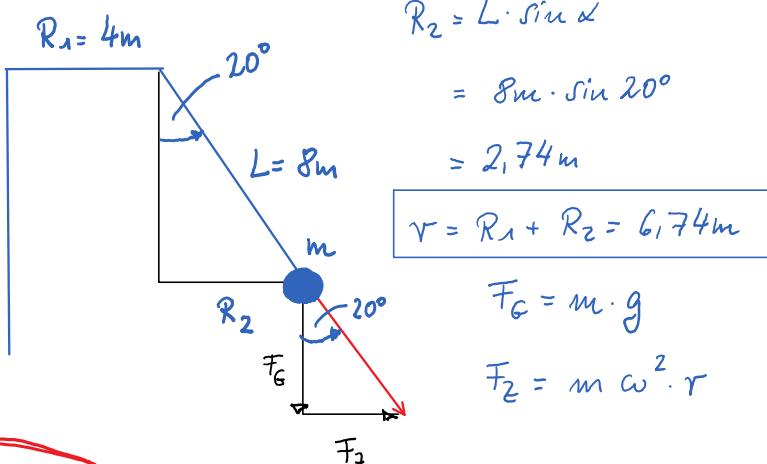
# AB6 - Lsg.

Samstag, 13. Juni 2020

04:52

Musterlösung AB6 vom 24.05. mit Tipps vom 27.05. :

3)



a)

$$f = \frac{\omega}{2\pi} = 0,116 \text{ Hz}$$

$$T = \frac{1}{f} = 8,631 \text{ s}$$

$$\frac{F_2}{F_G} = \tan \alpha = \frac{m \omega^2 r}{m g}$$

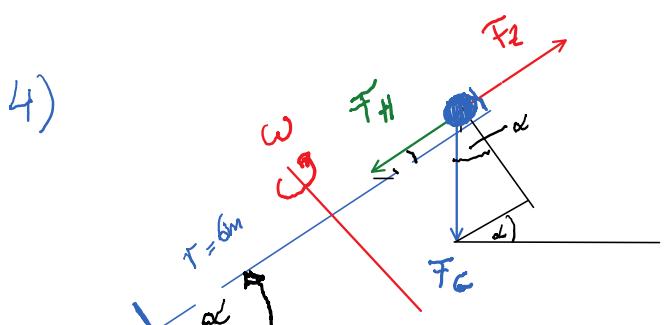
$$\Rightarrow \sqrt{\frac{g \cdot \tan \alpha}{r}} = \omega$$

$$\omega = 0,728 \frac{1}{\text{s}}$$

$$v = \omega \cdot r = 4,91 \frac{\text{m}}{\text{s}}$$

$$\begin{aligned} b) \quad F_{G_{\text{res}}} &= \sqrt{F_G^2 + F_2^2} = \sqrt{(m \cdot g)^2 + (m \omega^2 r)^2} = m \cdot \sqrt{g^2 + \omega^4 r^2} \\ &= 200 \text{ kg} \cdot \sqrt{(9,81 \frac{\text{m}}{\text{s}^2})^2 + 0,728^4 \cdot 6,74^2 \frac{\text{m}^2}{\text{s}^4}} \\ &= 200 \text{ kg} \cdot 10,44 \frac{\text{m}}{\text{s}^2} \approx 2087,3 \text{ N} \end{aligned}$$

4)



$$F_2 = m \omega^2 r$$

$$F_H = F_G \cdot \sin \alpha = m \cdot g \cdot \sin \alpha$$

"Gleichgewicht":  $F_H \doteq F_2$

$$\Rightarrow m \omega^2 r = m g \sin \alpha$$

$$\Rightarrow \omega = \sqrt{g \cdot \sin \alpha}$$

✓ ✗

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$$\Leftrightarrow M \omega r = m g \sin \alpha$$

$$\Leftrightarrow \omega = \sqrt{\frac{g \cdot \sin \alpha}{r}}$$

$$\Leftrightarrow f_{\min} = \frac{1}{2\pi} \sqrt{\frac{9,81 \text{ m/s}^2 \cdot \sin 50^\circ}{6 \text{ m}}}$$

$$= \underline{\underline{1,12 \text{ Hz}}}$$