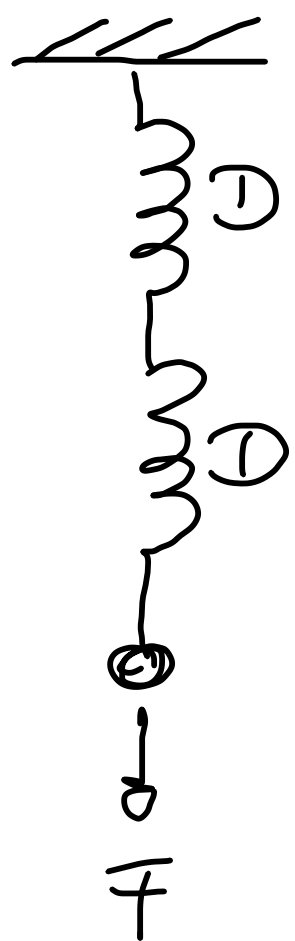


# Physics hour 04

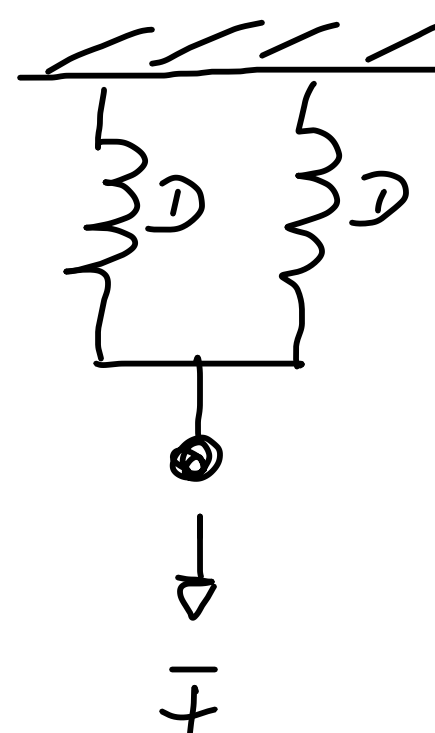
## 1) Federkraft 1)

$$\left. \begin{array}{l} \overline{F}_F = D \cdot x \\ \overline{F}_g = m \cdot g \end{array} \right\} mg = D \cdot x \rightarrow x = \frac{m \cdot g}{D} = \frac{0,7 \text{ kg} \cdot 10 \frac{\text{m}}{\text{s}^2}}{2,8 \frac{\text{N}}{\text{cm}}} = \frac{7}{2,8} \cdot \text{cm} = 2,5 \text{ cm}$$

## 2) Federkraft 2)

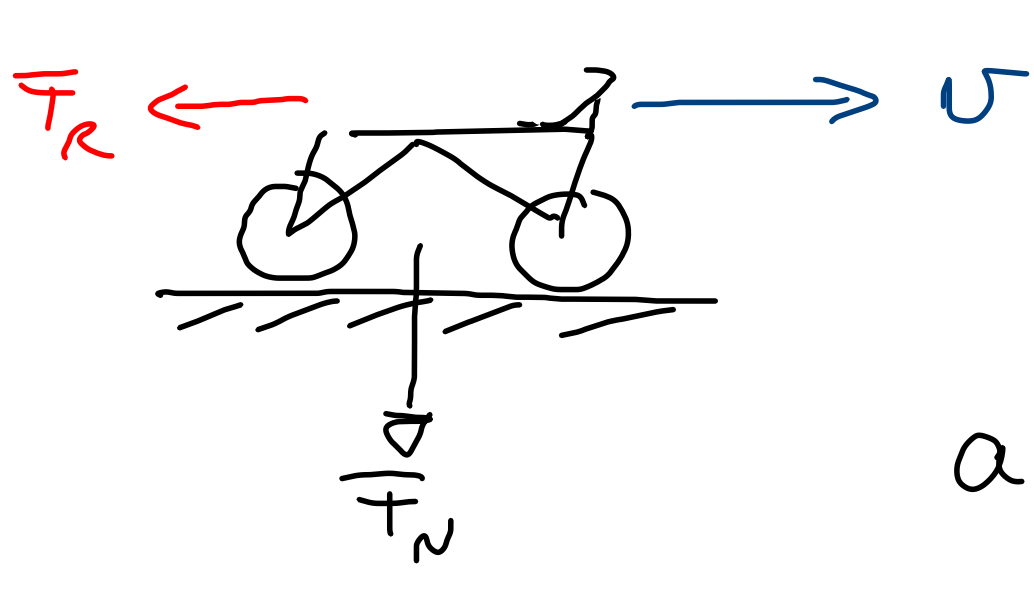


$$\left. \begin{array}{l} D_{\text{tot},1} = \frac{D \cdot D}{D + D} = \frac{D^2}{2D} = \frac{D}{2} \\ \overline{F} = D_{\text{tot},1} \cdot x_1 \\ x_1 = \frac{\overline{F}}{D_{\text{tot},1}} = \frac{\overline{F}}{\frac{D}{2}} = 2 \cdot \frac{\overline{F}}{D} \end{array} \right\}$$



$$\begin{aligned} D_{\text{tot},2} &= D + D = 2 \cdot D \\ x_2 &= \frac{\overline{F}}{D_{\text{tot},2}} = \frac{\overline{F}}{2D} = \frac{1}{2} \cdot \frac{\overline{F}}{D} \\ \frac{x_2}{x_1} &= \frac{\frac{1}{2} \cdot \frac{\overline{F}}{D}}{2 \cdot \frac{\overline{F}}{D}} = \frac{1}{4} \end{aligned}$$

### 3) Vollbremsung auf ebener Fläche



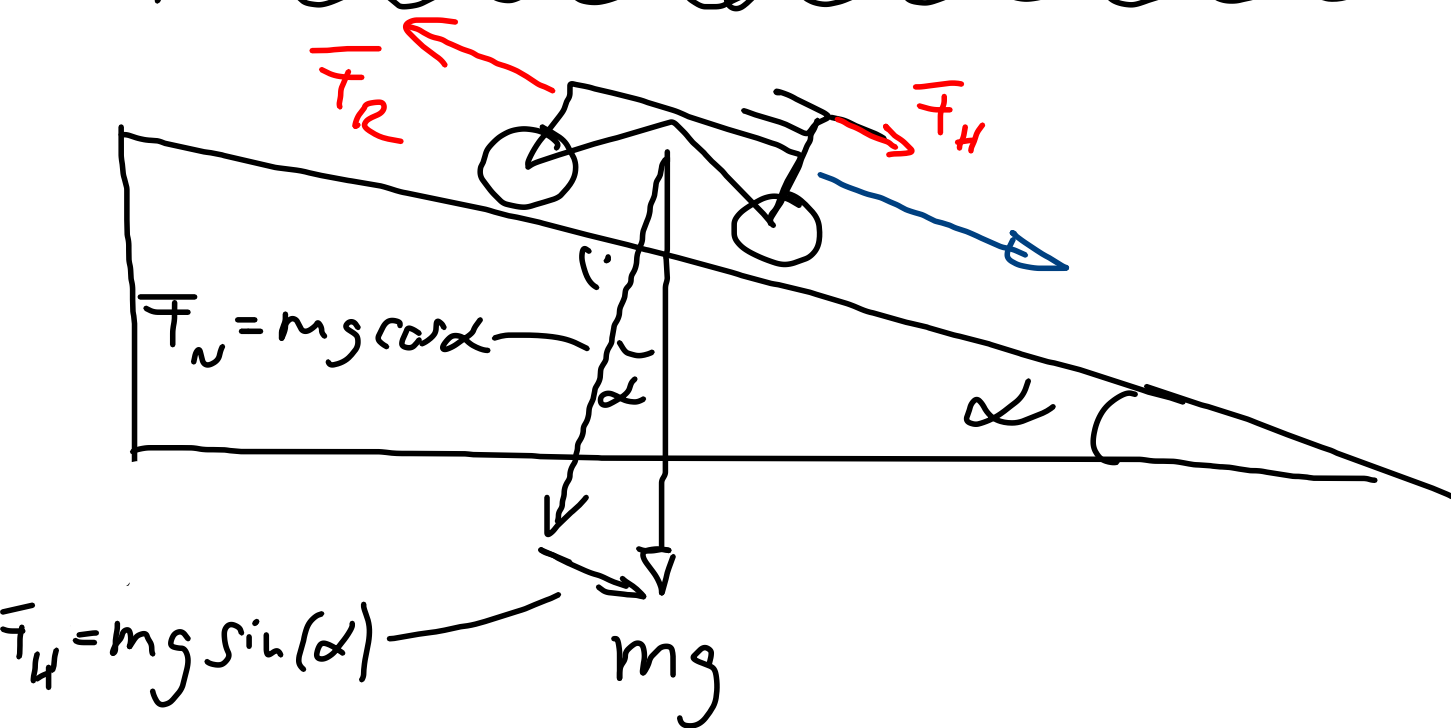
$$\begin{aligned} \overline{F}_R &= \mu_G \cdot \overline{F}_N = \mu_G \cdot m \cdot g \\ \overline{F}_R &= m \cdot a \end{aligned} \left. \vphantom{\begin{aligned} \overline{F}_R &= \mu_G \cdot \overline{F}_N \\ \overline{F}_R &= m \cdot a \end{aligned}} \right\} \begin{aligned} m \cdot a &= \mu_G m \cdot g \\ a &= \mu_G \cdot g \end{aligned}$$

$$a = \frac{dv}{dt} \stackrel{!}{=} \frac{\Delta v}{\Delta t} \rightarrow \Delta t = \frac{\Delta v}{a} = \frac{\Delta v}{\mu_G \cdot g}$$

$$\Delta t = \frac{12 \frac{m}{s}}{0,8 \cdot 10 \frac{m}{s^2}} = \frac{12}{8} s = 1,5 s$$

$$a = \text{const}$$

### 4) Vollbremsung auf schiefer Ebene

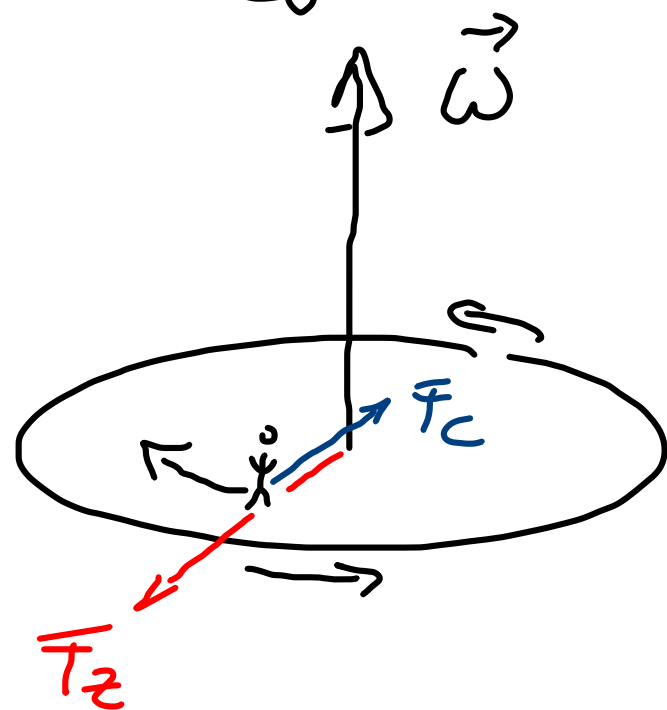


$$\begin{aligned} \overline{F}_{\text{net}} &= \overline{F}_R - \overline{F}_H = \mu_G \overbrace{mg \cos \alpha}^{\overline{F}_N} - mg \sin(\alpha) \\ &= m a \end{aligned}$$

$$\rightarrow a = \mu_G g \cos \alpha - g \sin(\alpha) = g(\mu_G \cos \alpha - \sin \alpha)$$

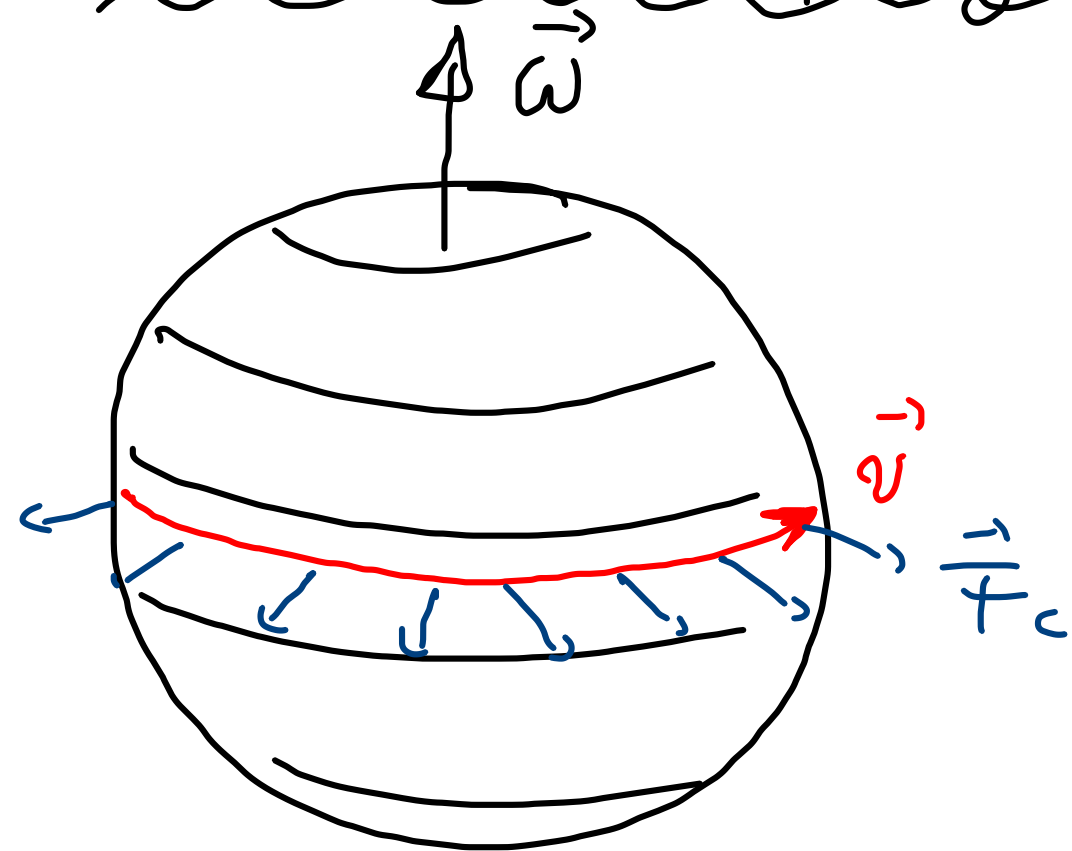
$$\Delta t = \frac{\Delta v}{a} = \frac{12 \frac{m}{s}}{10 \frac{m}{s^2} (0,8 \cdot \cos(20^\circ) - \sin(20^\circ))} = 2,9 s$$

# 5) Zentrifugalkraft und Corioliskraft



$$\vec{F}_C = 2m \cdot \vec{v} \times \vec{\omega}$$

# 6) Corioliskraft auf Zug am Äquator



radial vom Erdmittelp. weg

7) Corioliskraft am Äquator

$$\vec{F}_C = 2 m \vec{v} \times \vec{\omega} \quad \vec{v} \perp \vec{\omega}$$

$$\Rightarrow \overline{F}_C = 2 m v \cdot \omega \quad \Rightarrow \quad a = \frac{\overline{F}}{m} = 2 v \omega = 2 \cdot 100 \frac{\text{m}}{\text{s}} \cdot \frac{2\pi}{24 \cdot 3600 \text{s}} = 0,0143 \frac{\text{m}}{\text{s}^2}$$

$$\omega = \frac{2\pi}{24 \cdot 3600 \text{s}}$$

8) Buddy haut den Lukas

$$E_{\text{pot}} = E_{\text{kin}}$$

$$m_k g h = \frac{1}{2} m_H v^2 \quad \rightarrow$$

$$v = \sqrt{\frac{2 m_k g h}{m_H}} = \sqrt{\frac{2 \cdot 211 \text{ kg} \cdot 10 \frac{\text{m}}{\text{s}^2} \cdot 5 \text{ m}}{5 \text{ kg}}} \\ = \sqrt{2 \frac{\text{m}^2}{\text{s}^2}} = 1,41 \frac{\text{m}}{\text{s}}$$

