Experimentalphysik Übung (R. Weis)

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Contents

1 Aufgabe 3

1

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$$s_z = \frac{1}{2}at^2 + v_0t$$
$$s = v(t - t_v)$$

- 3 Möglichkeiten:
 - 1. zu langsam
 - 2. "zu" schnell
 - 3. "perfekt" richtig \implies gesucht

$$\frac{1}{2}at^{2} + v_{0}t = v_{p}(t - t_{v})$$

$$\implies t_{1,2} = \frac{v_{p} - v_{0} \pm \sqrt{(v_{0} - v_{p})^{2} - 2av_{p}t_{v}}}{a}$$

$$(v_{0} - v_{p})^{2} - 2av_{p}t_{v} = 0$$

 $\rightarrow v_p$

$$at + v_0 = v_p \implies t = \frac{v_p - v_0}{a}$$

 $v_p = v_0 + at_v \pm \sqrt{(at_v + v_0)^2 - v_0^2} \approx 11.9 \,\mathrm{m \, s^{-1}}$

$$x(t) = tv_{x0} = tv_0 \cos \alpha$$

$$y(t) = tv_0 \sin \alpha - \frac{1}{2}gt^2$$

$$x(T) = d \quad d = Tv_0 \cos \alpha \implies t = \frac{d}{v_0 \cos \alpha}$$

$$y(T) = \frac{d \sin \alpha}{\cos alpha} - \frac{1}{2}g\frac{d^2}{v_0^2 \cos^2 \alpha}$$

$$\implies v_0 = \sqrt{\frac{gd^2}{2\cos^2 \alpha(d\tan \alpha - h)}}$$

$$\Delta h = \frac{D_L - D_B}{2}$$

$$v_0 = \sqrt{\frac{gd^2}{2\cos^2 \alpha(a\tan \alpha - (h + \Delta h))}}$$