Fizika 1. Vaje

16. marec 2025

1 Kinematika

Ponovitev

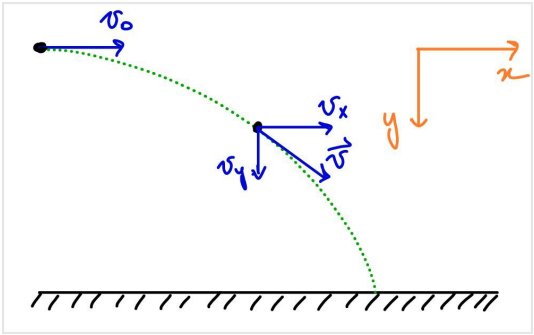
- **Kosinusni izrek.** $c^2 = a^2 + b^2 - 2ab\cos\alpha$, kjer je α kot med stranicama a in b.

1.1 Premo gibanje

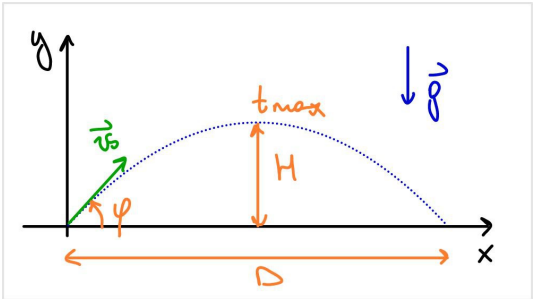
- **Enakomerno pospešeno gibanje.**
  - $a := \frac{dv}{dt} = \text{const}$
  - $dv = a\,dt \Rightarrow \int_{v_0}^{v} dv = a\int_0^t dt \Rightarrow v - v_0 = at \Rightarrow \boxed{v = v_0 + at}$
  - $v := \dfrac{ds}{dt} \Rightarrow ds = (v_0 + at)\,dt \Rightarrow \int_0^s ds = \int_0^t (v_0 + at)\,dt \Rightarrow \boxed{s = v_0 t + \frac{1}{2}at^2}$
  - $v = \dfrac{ds}{dt},\ a = \dfrac{dv}{dt} \Rightarrow v\,dt = ds,\ a\,dt = dv \Rightarrow \dfrac{v}{a} = \dfrac{ds}{dv} \Rightarrow v\,dv = a\,ds \Rightarrow \int_{v_0}^{v} v\,dv = \int_0^s a\,ds$
    $\Rightarrow \dfrac{v^2}{2} - \dfrac{v_0^2}{2} = as \Rightarrow \boxed{v^2 - v_0^2 = 2as}$, če imamo delo z pojemkom, spremenimo predznak
- **Enakomerno gibanje.** Vzemimo $a = 0$
- Če se da, izognemo se kvadratnih enačb
- **Prosti pad.** ($v_0 = 0,\ g = 9.8\ \text{m/s}^2$)
  - $\boxed{v = gt,\ t = \sqrt{\dfrac{2h}{g}},\ h = \dfrac{1}{2}gt^2}$

1.2 Ravninsko gibanje

- **Relativna hitrost.** $\vec{v}_r = \vec{v}_1 - \vec{v}_2,\ v_r = |\vec{v}_1 - \vec{v}_2|$
- **Vodoravni met.**



  - $\boxed{x(t) = v_0 t,\ y(t) = \dfrac{1}{2}gt^2}$
- **Poševni met.**



  - $\boxed{x(t) = v_0 t\cos\phi,\ y(t) = v_0 t\sin\phi - \dfrac{1}{2}gt^2}$
  - $\boxed{t_{\max} = \dfrac{v_0\sin\phi}{g},\ D = \dfrac{v_0^2\sin 2\phi}{g},\ H = \dfrac{v_0^2\sin^2\phi}{2g}}$