

Dobrý den!

① / 7

3. přednáška

opakování

I. NPŽ ... ✓

II. NPŽ ...

III. NPŽ ... ✓

$$\vec{F}_V = m\vec{a}$$

!

Práce a výkon

i) práce síly, obecně pohyb: (\vec{F}, \vec{v})

ii) práce pohybu, $-n-$ jedná se síl.

Postup:

i) zvolíme volba vhodné vztahů soustavy.

ii) přechů osvatez (nemí un tno 3D).

iii) Po síly působící na těleso m
(tovesit) 3 rovnice

iv) $\vec{F}_V = m\vec{a}$ \leftarrow vřepřat do os
(sčítat)

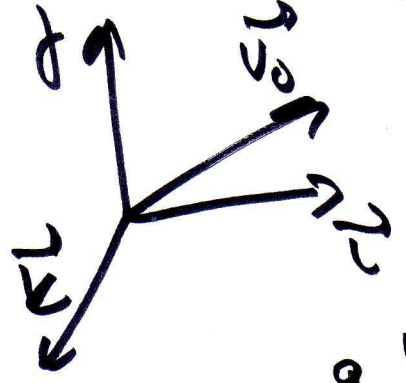
v) řídit vachstní s danylní pož. podm.

vi) podřeknout n šedel a měřítlet
o jeho vřolochovní (mlíkt, jedantý)

transakčné (HVTOME) prázdný ústí II. NP:

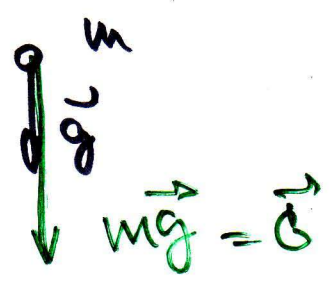
1) Polný by v trávěin poli keme:

i) $\vec{a} = \vec{g} = (0, -g, 0)$; \vec{v}_0, \vec{r}_0



$F_0 = ma \downarrow g$

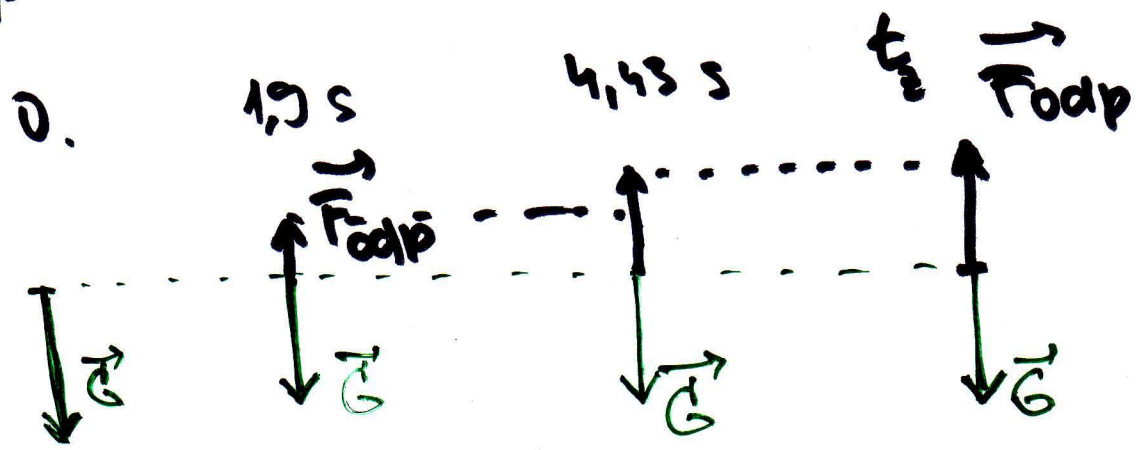
$\vec{F}_0 = \vec{G} = mg$



ii) rapídum zaprvu istouchu:
vit HEW (wete padajú)

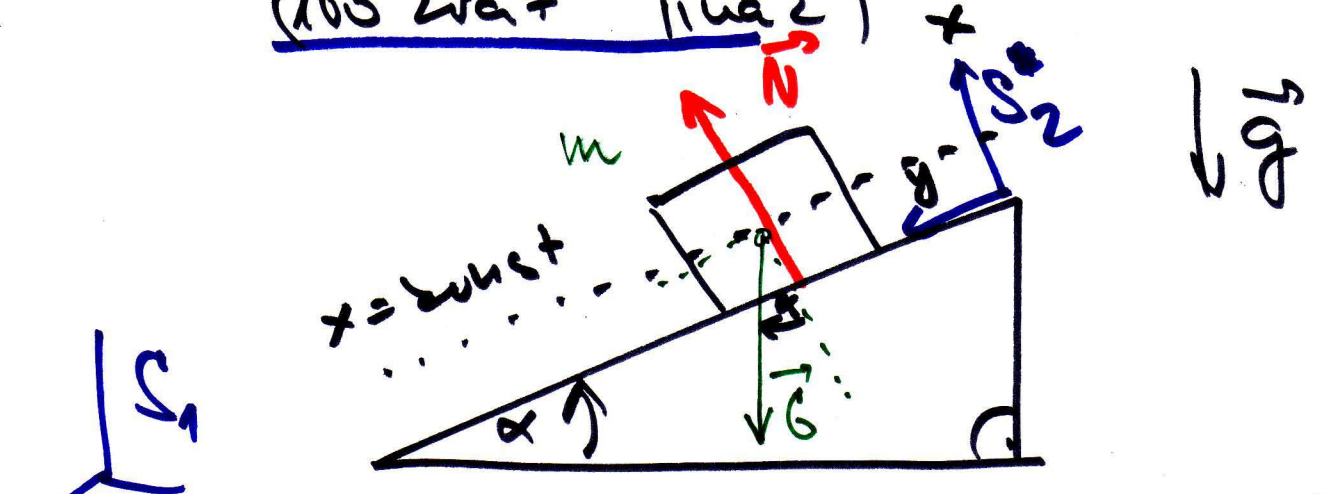
$F_{odp} \approx v^2$

čas:



$\vec{v}(t_2)$.. meru rychlost

② Nebenebene vorher
(100 Watt iina 2)

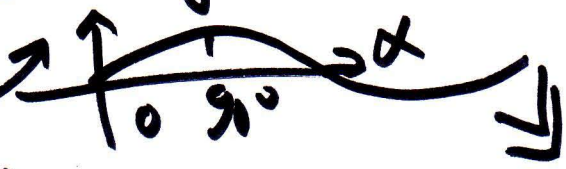


$\vec{F}_U = m\vec{a}$ $S_2: \vec{G} = (\dots)$ $\vec{N} = (\dots)$
 ↑ \vec{a} \vec{S}_2 \vec{G} \vec{N}

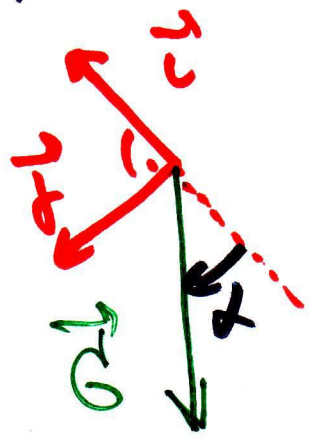
Podhad \vec{a} : $\ddot{x} = 0$

$\ddot{y} \dots \ddot{y}(0^\circ) = 0$
 $\ddot{y}(90^\circ) = g > 0$

$\ddot{y}(\alpha) = ? = g \sin \alpha$



$\vec{F}_U = m\vec{a}$ $\vec{F}_U = \vec{G} + \vec{N}$ $\vec{G} = (\dots)$



$G_x = \vec{G} \cdot \vec{c} = mg \cos(180^\circ - \alpha)$
 $G_y = \vec{G} \cdot \vec{j} = mg \cos(90^\circ - \alpha)$

$\vec{G} = (mg \cos(\alpha), mg \sin(\alpha))$

$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$
 $\cos(180^\circ - \alpha) = -1 \cos \alpha + 0 = -\cos \alpha$

$$\vec{G} = (-mg \cos \alpha; mg \sin \alpha; 0)$$

$$\vec{N} = (N; 0; 0)$$

$$\vec{F}_V = \vec{G} + \vec{N} = (N - mg \cos \alpha; mg \sin \alpha; 0) \\ = m\vec{a} = m(\ddot{x}; \ddot{y}; \ddot{z})$$

3 skalárne rovnice:

$$m\ddot{x} = N - mg \cos \alpha = 0 \quad (x = \text{const.})$$

$$m\ddot{y} = mg \sin \alpha \Rightarrow \ddot{y} = g \sin \alpha$$

$$m\ddot{z} = 0 \Rightarrow \ddot{z} = 0$$

poč. podm.: ...

$$\vec{a} = (0, g \sin \alpha, 0) \text{ smerom v } \text{odhadem.}$$

vedieť si "produkt":



$$N(\alpha) = mg \cos \alpha$$

↑
site od predmetu



Pr. Nazl. rovina + treni

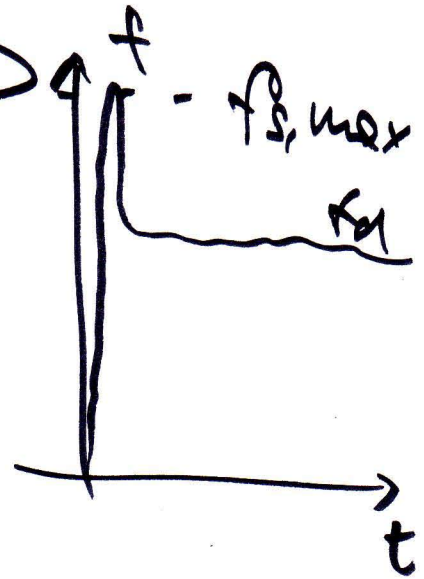
It co trie vemi?

ut to vime... \Downarrow

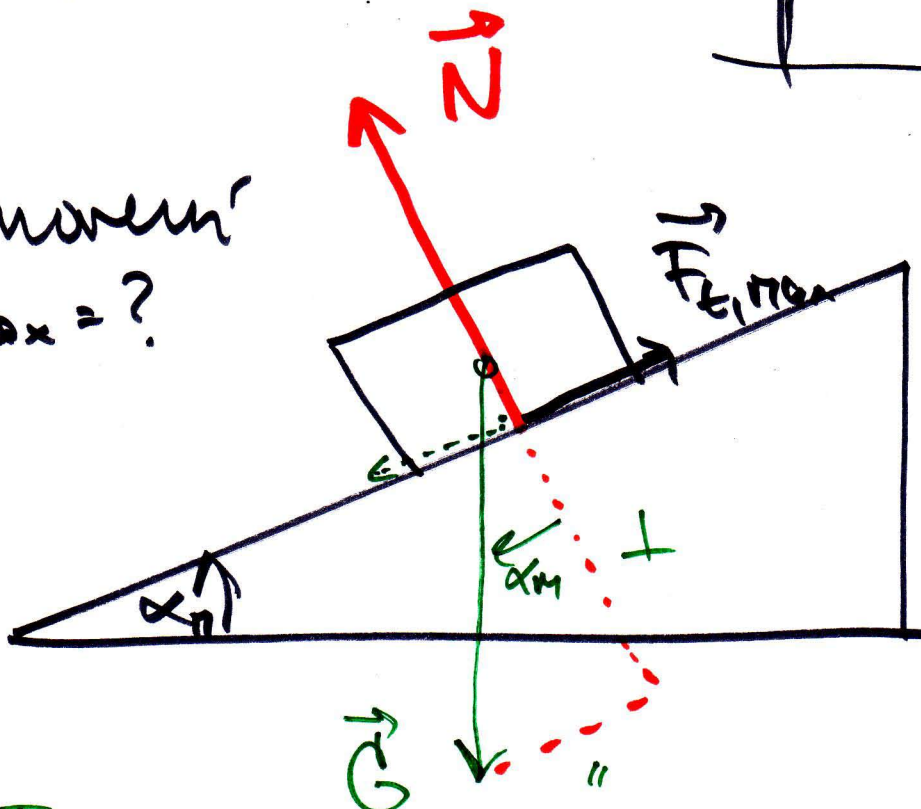
Statiches' treni sila:

$\langle 0, F_{t,s,max} \rangle$

$0 \leq |F_{t,s,max}| = f_{s,max} |N|$



a) Stanoveni' $f_{s,max} = ?$



$|\vec{F}_{em}| = f_s |\vec{N}|$
 $= f_s mg \cos \alpha$

$G_{||} = F_{t,max}$

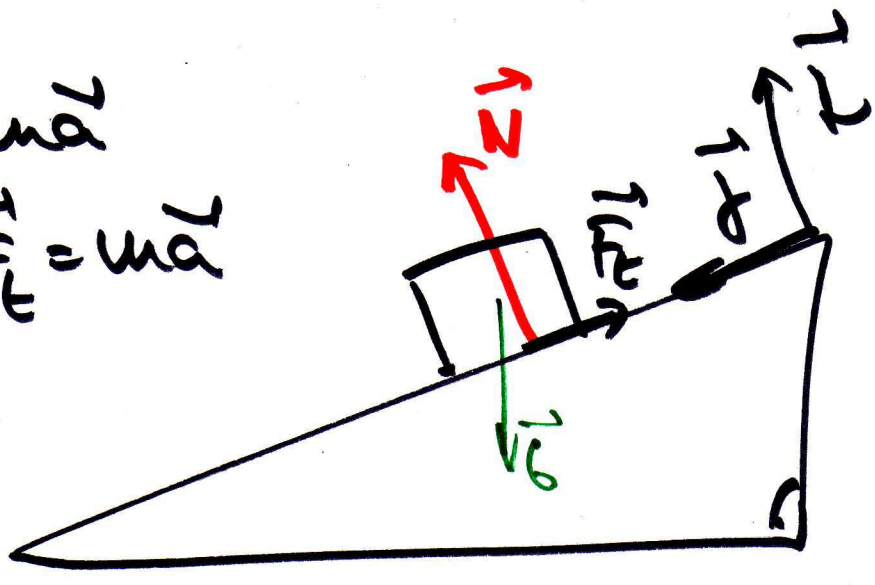
$mg \sin \alpha = mg f_s \cos \alpha$

$f_s = \frac{\sin \alpha}{\cos \alpha} = \tan \alpha$

b) Stanoveni' $f_d = ?$

$$\vec{F}_L = ma^L$$

$$\vec{N} + \vec{G} + \vec{F}_L = ma^L$$



$$\vec{z} = (N, \emptyset, \emptyset)$$

$$\vec{G} = (-mg \cos \alpha, mg \sin \alpha, \emptyset)$$

$$\vec{F}_L = (-F_L, \emptyset, \emptyset)$$

" $m\ddot{x}$ $m\ddot{y}$...

$$m\ddot{x} = N - mg \cos \alpha - F_L$$

$$m\ddot{y} = mg \sin \alpha - F_L$$

$$m\ddot{z} = \emptyset$$

+ problem $\therefore x = \text{const.}$

$$\left. \begin{aligned} 0 &= N - mg \cos \alpha \\ m\ddot{y} &= mg \sin \alpha - F_L \end{aligned} \right\} \Rightarrow F_L = \text{fd} N = \text{fd} mg \cos \alpha$$

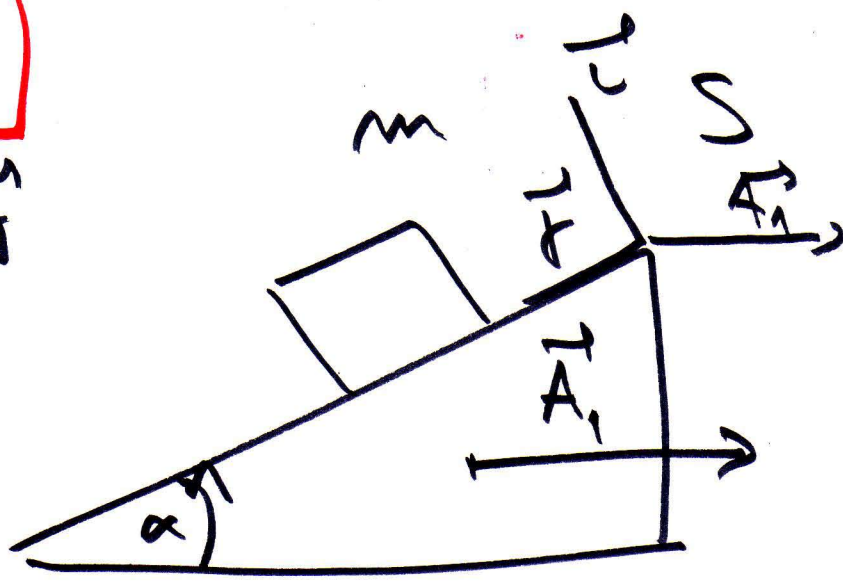
~~$m\ddot{y} = mg \sin \alpha - \text{fd} mg \cos \alpha \Rightarrow$~~

odvoda:

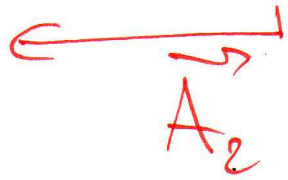
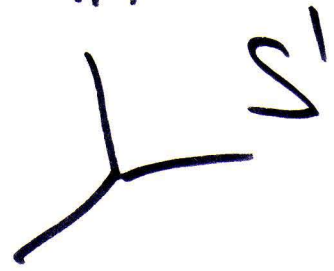
$$\ddot{y} = \frac{mg}{m} (\sin \alpha - \text{fd} \cos \alpha)$$

$$\ddot{y} = g (\sin \alpha - \text{fd} \cos \alpha) \checkmark$$

DC
↓ g



Dann
 m, g, α
 A_1, A_2



Werte:
a) m, g, S a)
b)