

אנליזה

$$\vec{F} = mg \hat{y}$$

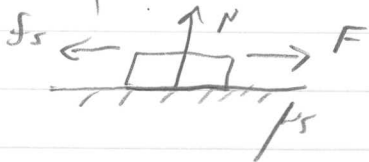
אנליזה

$$f_s \leq N \cdot \mu_s$$

אנליזה

אנליזה -  $\mu_s$

אנליזה של כוחות  $f_s$  ו- $F$  על גוף



$$\|f_s\| = \|F\|$$

$$F \leq N \mu_s$$

אנליזה

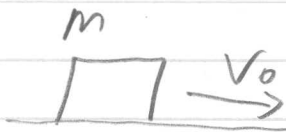
$$F > N \mu_s$$

אנליזה

$$f_k = N \mu_k$$

אנליזה של כוחות  $F_k = -m \bar{a}$  ו- $\bar{a}$  על גוף

אנליזה של כוחות  $F_k$  ו- $\bar{a}$  על גוף



$$\Sigma F_y = 0 \Rightarrow N = mg \quad \text{y} \quad \cdot 32$$

$$\Sigma F_x = f_k = -N\mu_k = -mg\mu_k \quad \text{x} \quad \cdot 32$$

$$F_x = ma_x = -mg\mu_k$$

$$a_x = -g\mu_k$$

$$v(t) = v_0 - g\mu_k t = 0 \quad t = \frac{v_0}{g\mu_k}$$

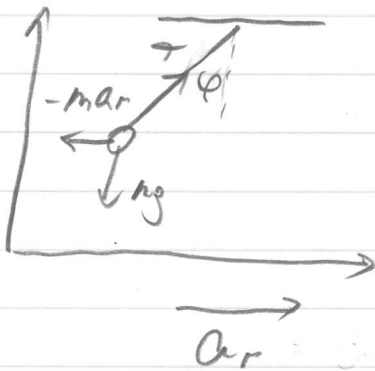
$$x(t) = 0 + v_0 \cdot t - \frac{g\mu_k t^2}{2} = L$$

$$\frac{v_0^2}{g\mu_k} - \frac{g\mu_k \cdot v_0^2}{2g^2\mu_k^2} = L$$

$$\frac{v_0^2}{g\mu_k} - \frac{v_0^2}{2g\mu_k} = L = \frac{v_0^2}{2g\mu_k}$$

$$\mu_k = \frac{v_0^2}{2gL}$$

$$t = \frac{v_0}{g} \cdot \frac{2gL}{v_0^2} = \frac{2L}{v_0}$$



3rd case - 2nd case

$$\Sigma \vec{F} = \vec{0}$$

2nd case - 1st case

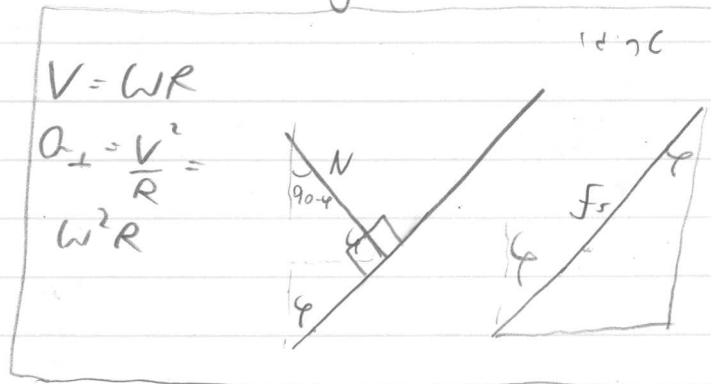
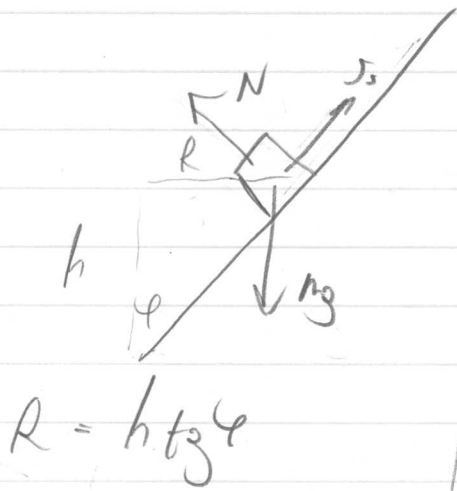
$$\Sigma F_y = T \cos \varphi - mg = 0 \Rightarrow T = \frac{mg}{\cos \varphi}$$

$$\Sigma F_x = T \sin \varphi - ma_r = 0$$

$$mg \tan \varphi = ma_r$$

$$\tan \varphi = \frac{a_r}{g}$$

$$\varphi = \tan^{-1} \frac{a_r}{g}$$



$$\begin{cases} \Sigma F_y = N \sin \phi - mg + f_s \cos \phi = 0 \\ \Sigma F_x = f_s \sin \phi - N \cos \phi = -m \omega^2 R \\ f_s \leq N \mu_s \end{cases}$$

$$f_s = N \mu_s$$

$$N (\mu_s \cos \phi + \sin \phi) = mg$$

$$N (\mu_s \sin \phi - \cos \phi) = -m \omega^2 R$$

$$\left( \frac{\cos \phi - \mu_s \sin \phi}{\sin \phi + \mu_s \cos \phi} \right) = \frac{\omega^2 R}{g}$$

$$\omega = \sqrt{\frac{g}{R} \left( \frac{\cos \phi - \mu_s \sin \phi}{\sin \phi + \mu_s \cos \phi} \right)}$$