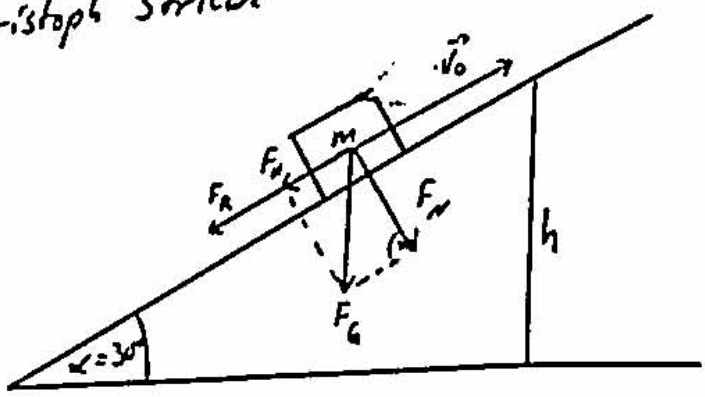
Christoph Stricve

M20



$m = 1\,kg$
$\alpha = 30°$
$\mu = 0{,}7$
$v_0 = 100\,\frac{m}{s}$

$F_G = m \cdot g = 1\,kg \cdot 9{,}81\,\frac{m}{s^2} = 9{,}81\,N$

$F_N = F_G \cdot \cos\alpha = 9{,}81\,N \cdot \cos 30° = 8{,}5\,N$

$F_R = F_N \cdot \mu = 8{,}5\,N \cdot 0{,}7 = 5{,}95\,N$

$F_H = F_G \cdot \sin\alpha = 9{,}81\,N \cdot \sin 30° = 4{,}9\,N$

$F_{Bremsung} = F_H + F_R = 4{,}9\,N + 5{,}95\,N = 10{,}85\,N$

$E_{kin} = \frac{m}{2} v^2 = 0{,}5\,kg \cdot 10000\,\frac{m^2}{s^2} = 5000\,\frac{kg\,m^2}{s^2} = 5000\,Nm$

Bremsweg: $5000\,Nm - 10{,}85 \cdot s = 0$

$s = \frac{5000\,Nm}{10{,}85\,m} = 460{,}83\,m$

a) $h = s \cdot \sin 30° = 460{,}83\,m \cdot \sin 30° = 230{,}4\,m$

Durchschnittsgeschwindigkeit:

$\bar{v} = \frac{1}{2}(v_0 + v_1) = \frac{1}{2}(100\,\frac{m}{s} + 0\,\frac{m}{s}) = 50\,\frac{m}{s}$

b) Bremszeit: $t_B = \frac{s}{\bar{v}} = \frac{460{,}83\,m\,s}{50\,m} = 9{,}22\,s$