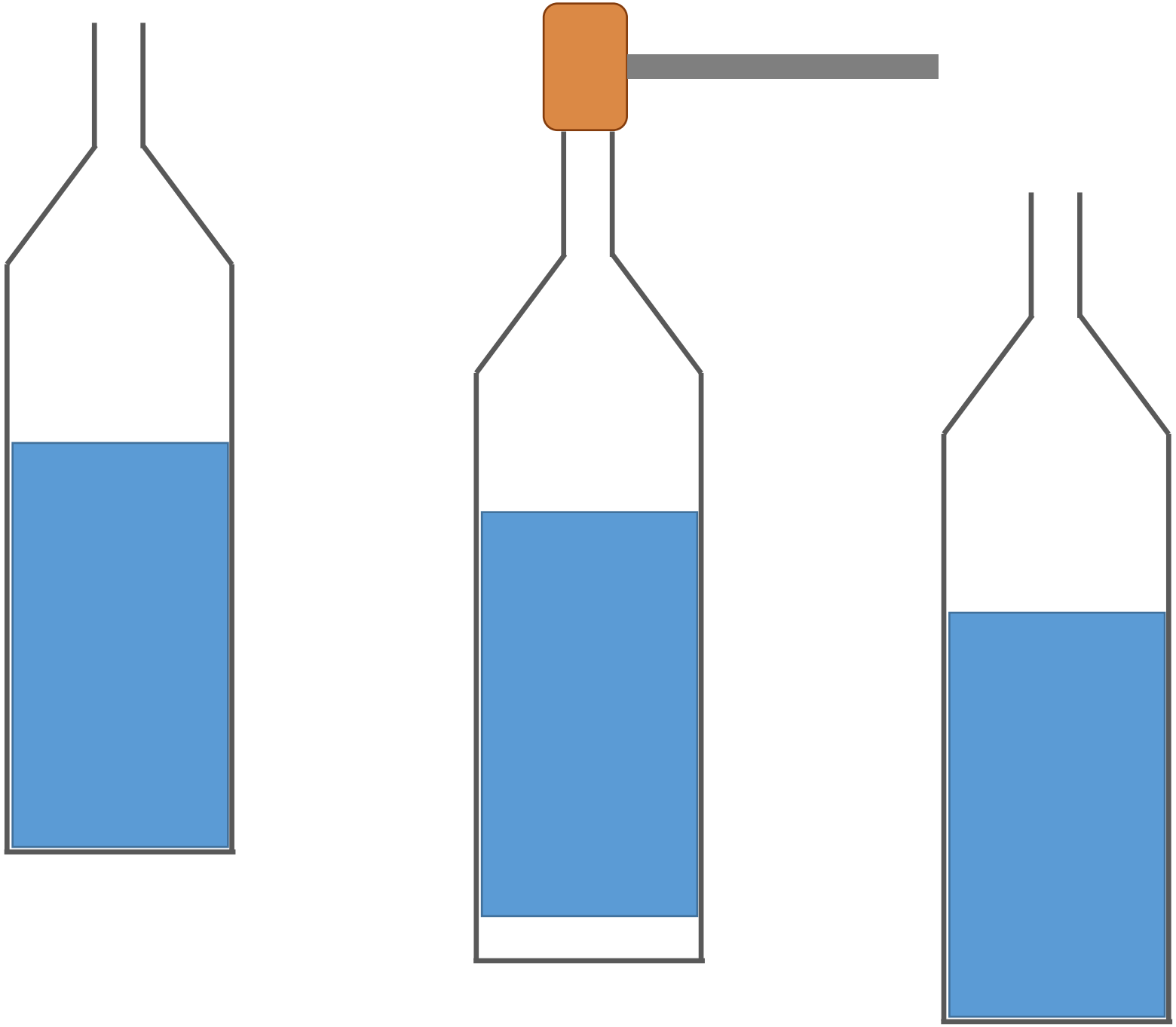
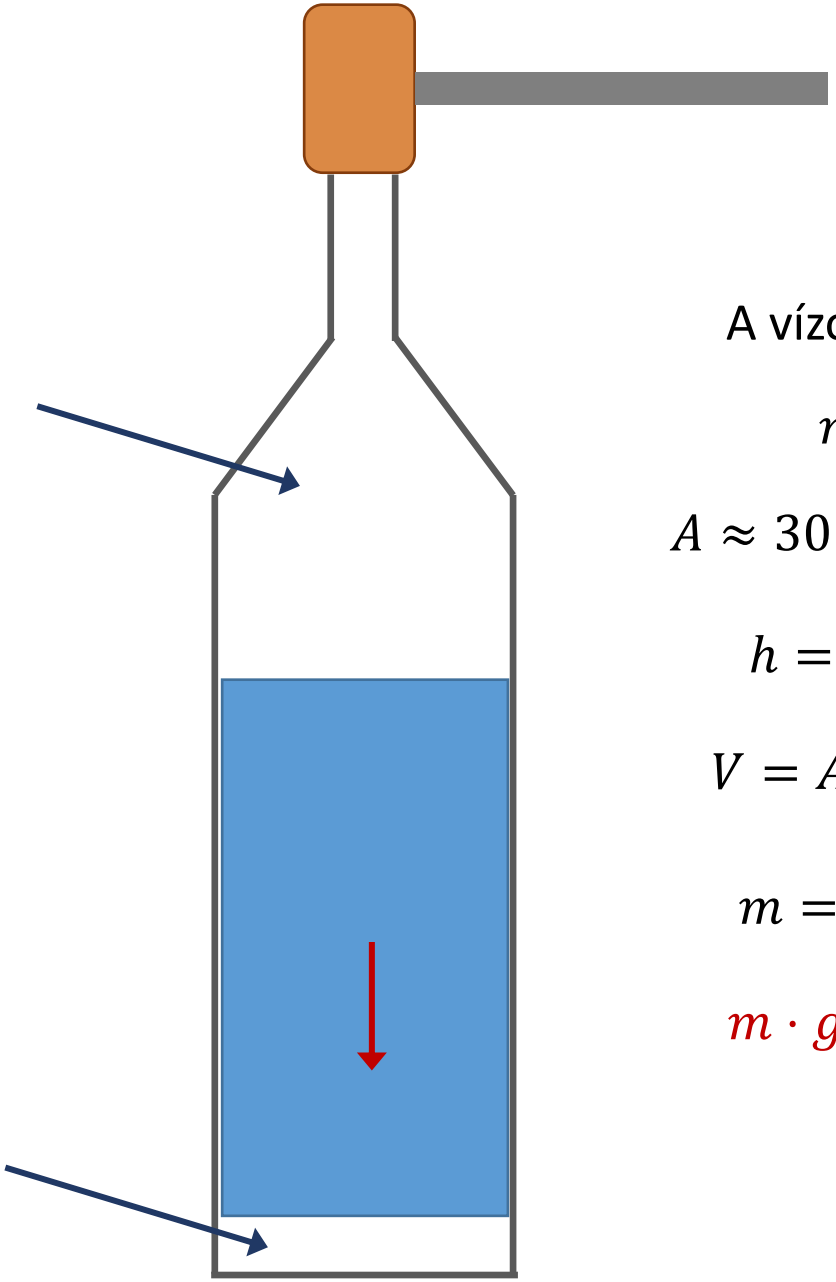
Beer bottle trick – 2500 fps (frame per seconds)

https://www.youtube.com/watch?v=lj3x2U4CaEs



Levegő

$p_1 = 10^5\ Pa$



Telített vízgőz

$p_2 = ?$

A vízoszlop:

$r = 3{,}5\ cm$

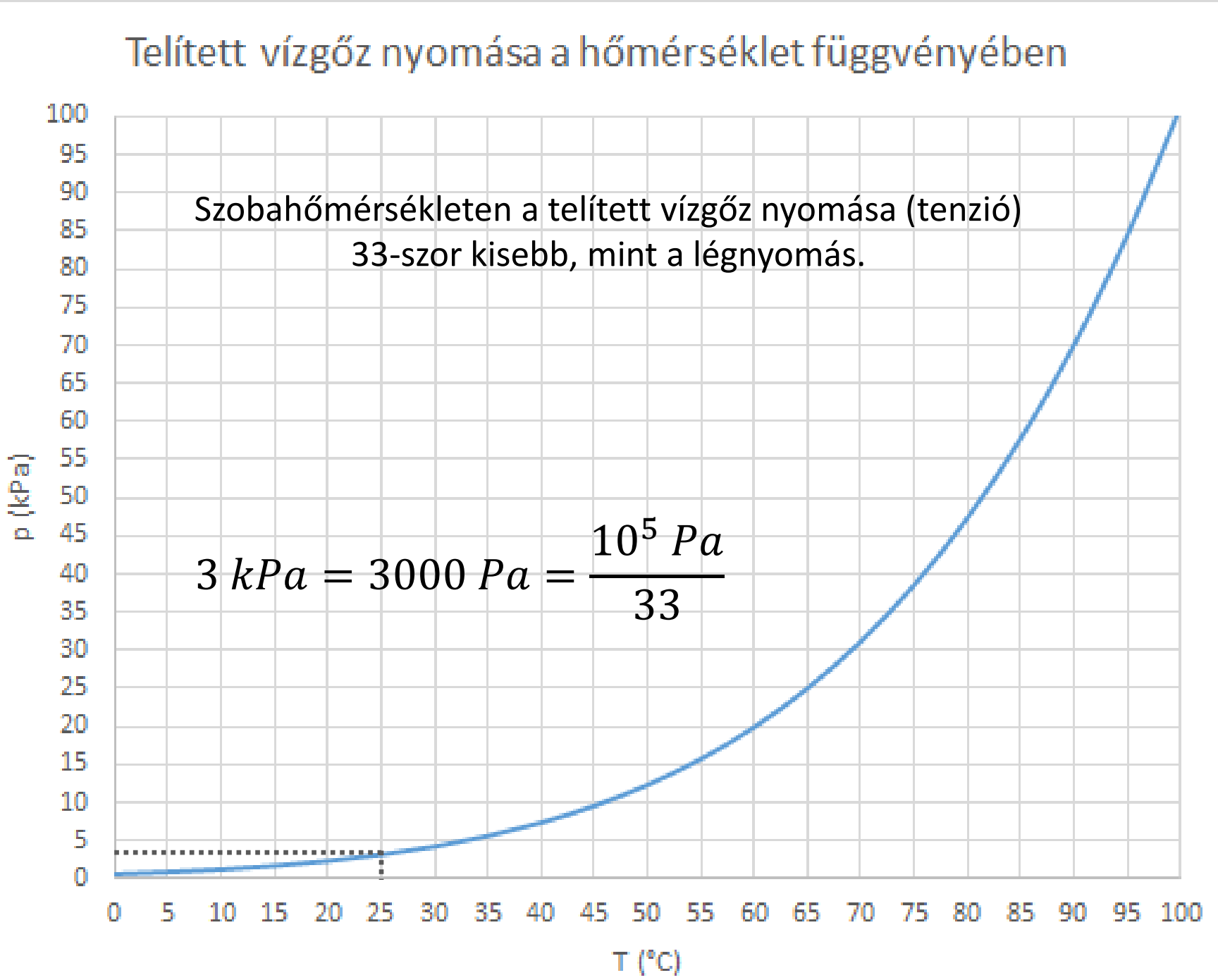
$A \approx 30\ cm^2 = 0{,}003\ m^2$

$h = 20\ cm = 0{,}2\ m$

$V = A \cdot h = 0{,}0006\ m^3$

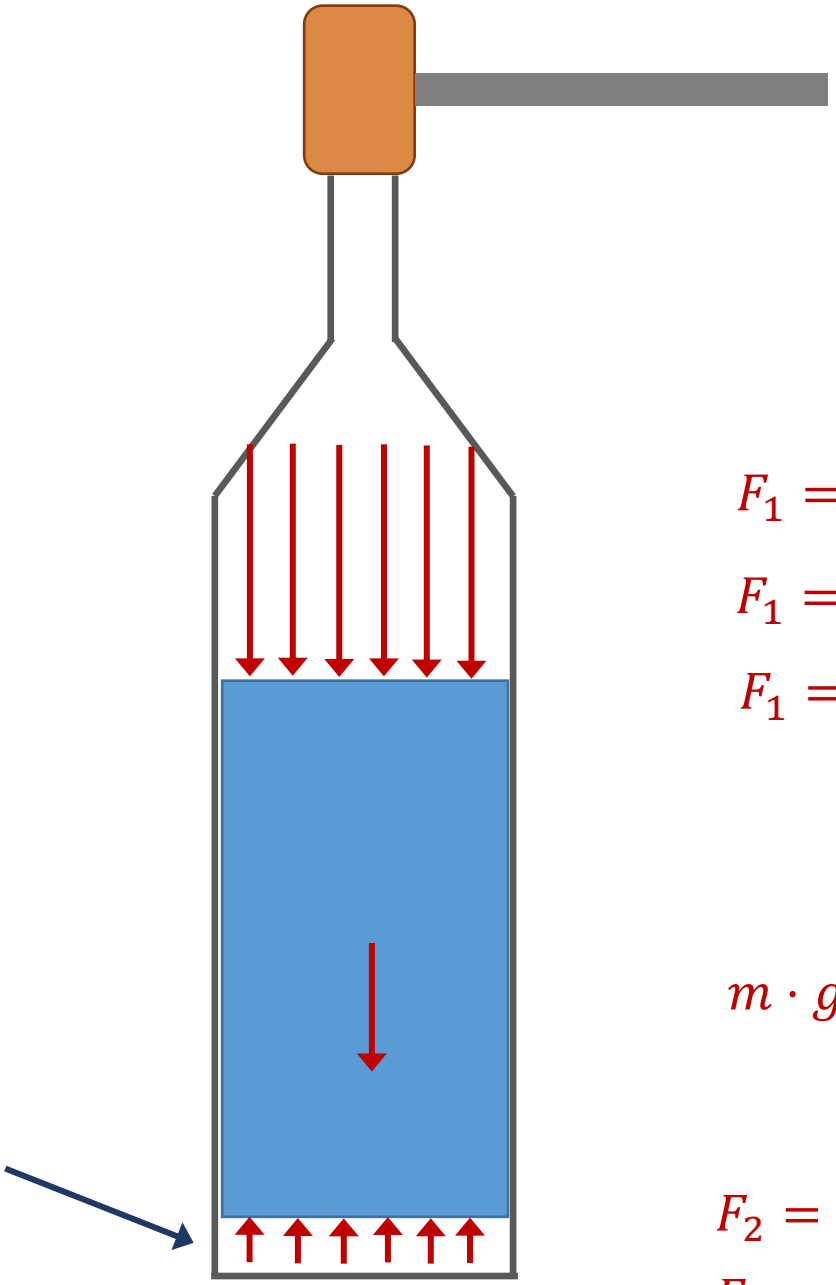
$m = \rho \cdot V = 0{,}6\ kg$

$m \cdot g = 6\ N$


Telített vízgőz nyomása a hőmérséklet függvényében
Szobahőmérsékleten a telített vízgőz nyomása (tenzió)
33-szor kisebb, mint a légnyomás.
$3\ kPa = 3000\ Pa = \frac{10^5\ Pa}{33}$
p (kPa)
T (°C)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Levegő

$p_1 = 10^5\ Pa$



$F_1 = p_1 \cdot A$

$F_1 = 10^5\ Pa \cdot 0{,}003\ m^2$

$F_1 = 300\ N$

$m \cdot g = 6\ N$

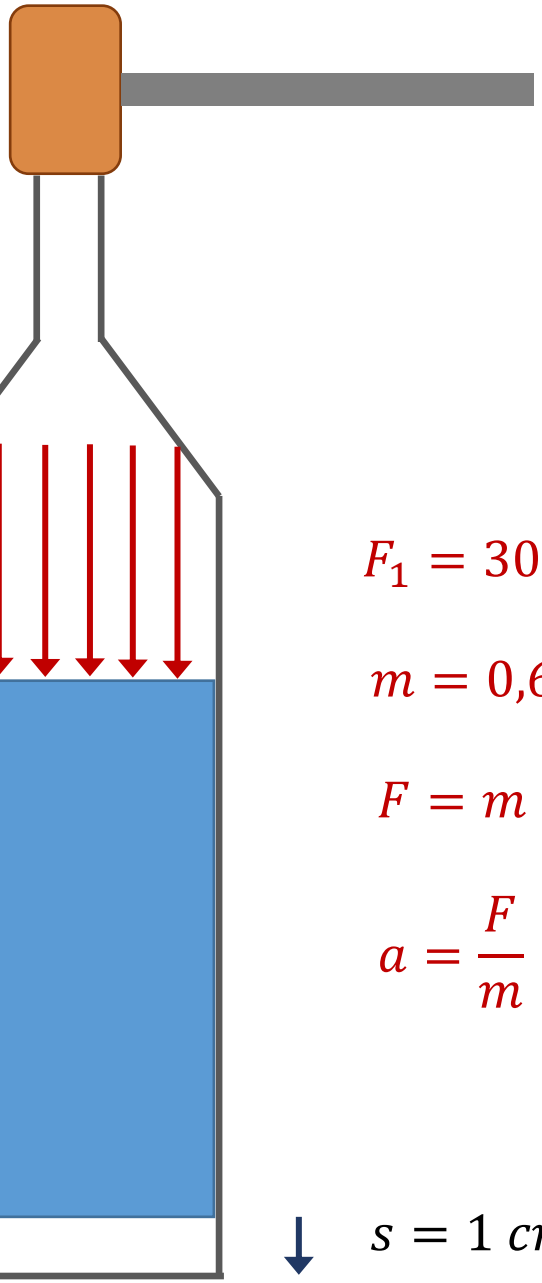
Telített vízgőz

$p_2 = 3000\ Pa$

$F_2 = p_2 \cdot A$

$F_2 = 3000\ Pa \cdot 0{,}003\ m^2$

$F_2 = 9\ N$



Levegő

$p_1 = 10^5\ Pa$

$F_1 = 300N$

$m = 0{,}6\ kg$

$F = m \cdot a$

$a = \frac{F}{m} = 500\ \frac{m}{s^2}\ (= 50\ g\ !)$

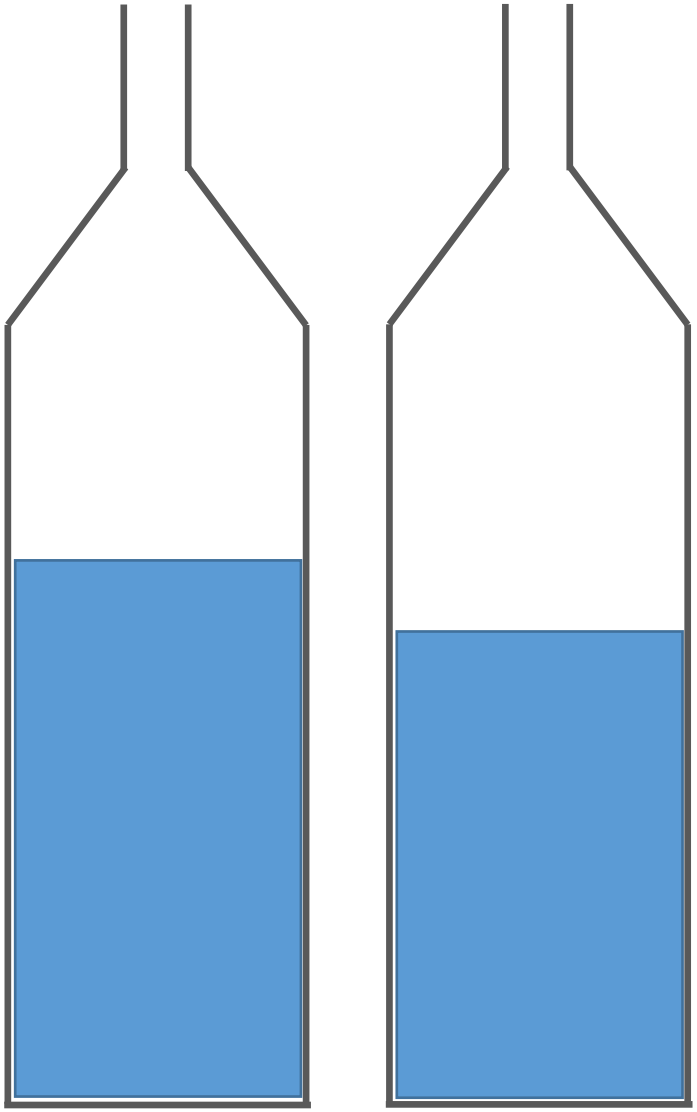
Telített vízgőz

$p_2 = 3000\ Pa$

$s = 1\ cm = \frac{1}{2} a \cdot (\Delta t)^2$

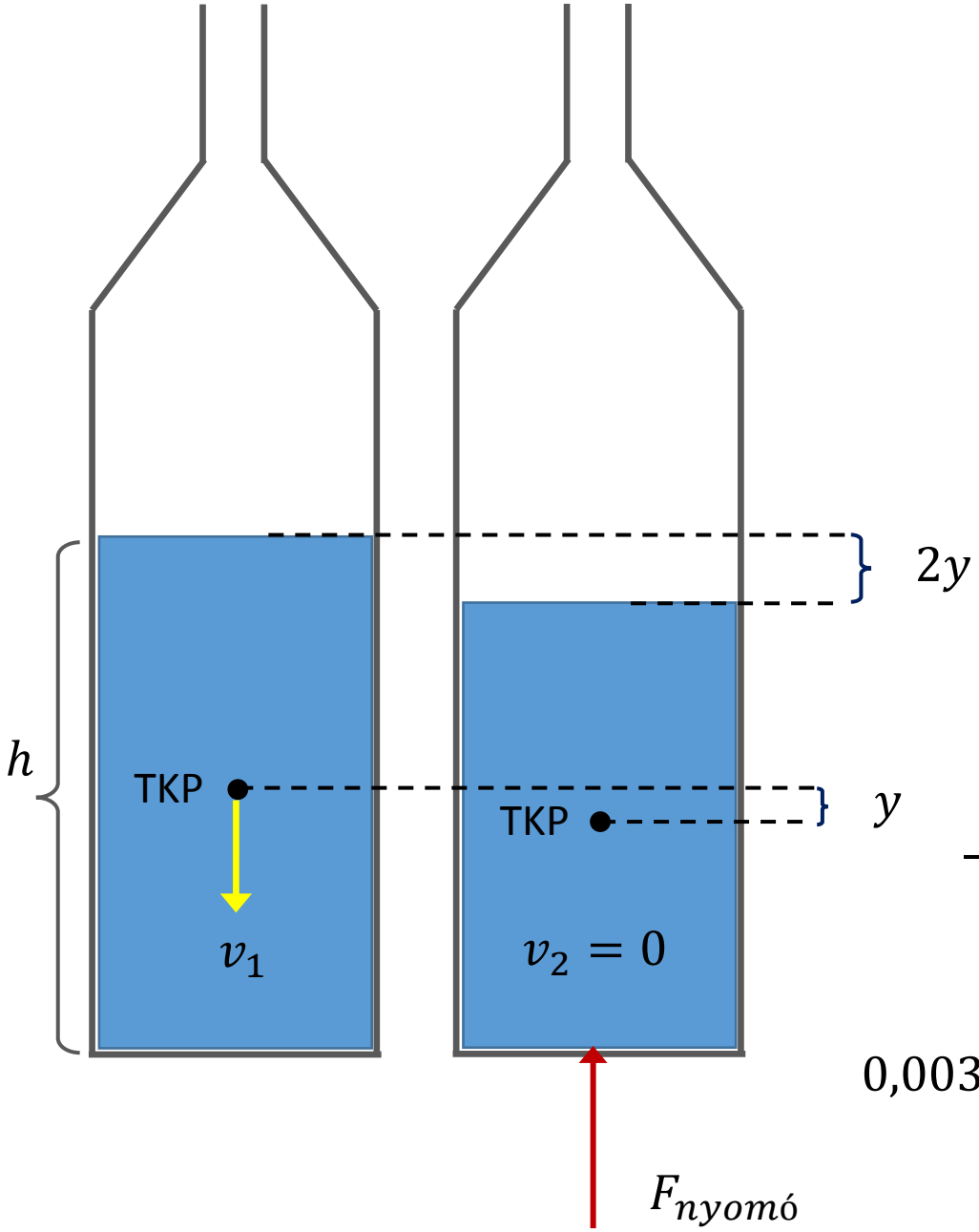
$\Delta t \approx 0{,}006\ s$

$v_1 = a \cdot \Delta t = 500\ \frac{m}{s^2} \cdot 0{,}006\ s \approx 3\ \frac{m}{s}$



K

Kiskocsisor ütközése – Galilei trükkjével



Munkatétel:

$$\Delta E_{mozg} = W_F = \vec{F} \cdot \vec{s}$$

$$0 - \frac{1}{2} m \cdot {v_1}^2 = F_{átl} \cdot (-y)$$

$$\frac{1}{2} m \cdot {v_1}^2 = F_{átl} \cdot y$$

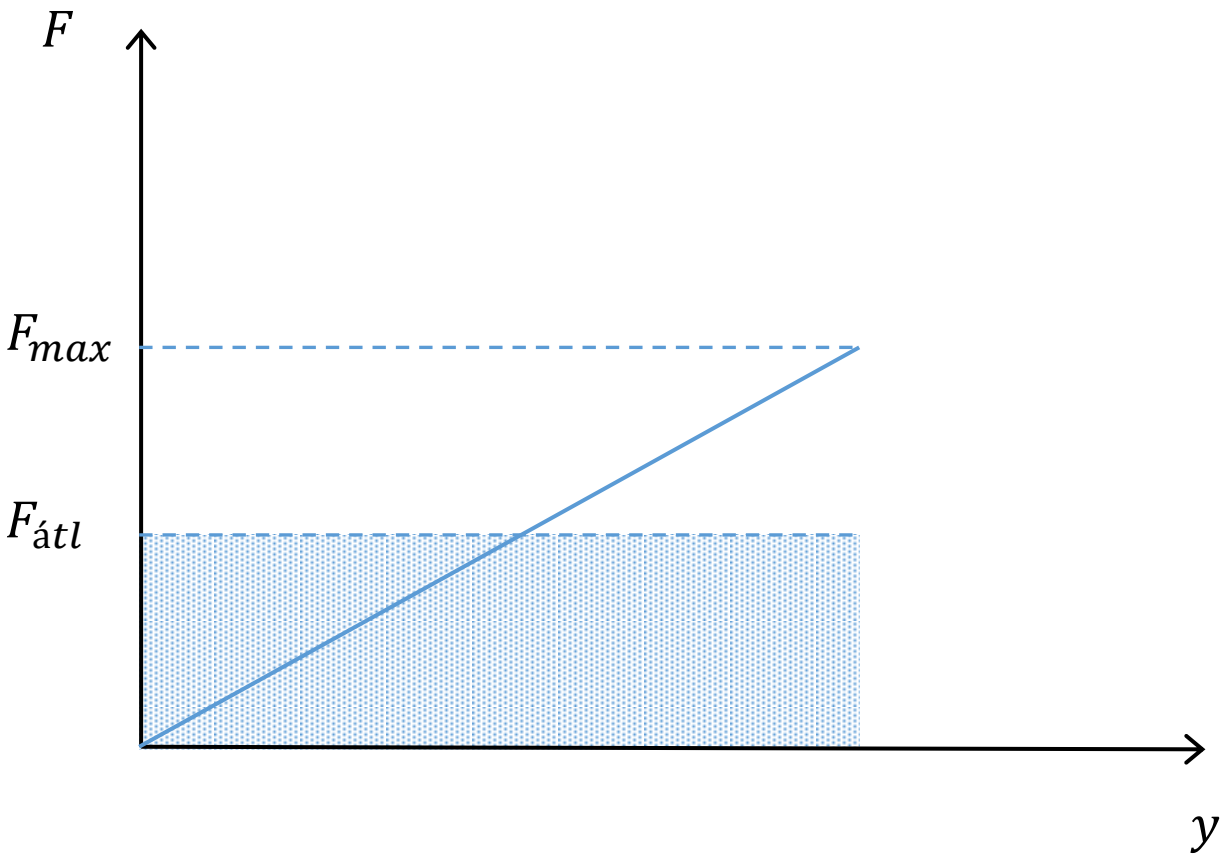
$$\Delta V = -\frac{1}{K} \cdot V \cdot \Delta p$$

$$-A \cdot 2y = -\frac{1}{2{,}2 \cdot 10^9 \ \frac{N}{m^2}} \cdot A \cdot h \cdot \frac{F}{A}$$

$$0{,}003 \ m^2 \cdot 2y \cdot 2{,}2 \cdot 10^9 \ \frac{N}{m^2} = 0{,}2 \ m \cdot F$$

$$F = 6{,}6 \cdot 10^7 \cdot y \cdot \frac{N}{m}$$

$$F = 6{,}6 \cdot 10^7 \cdot y \cdot \frac{N}{m}$$



$$\frac{1}{2} m \cdot {v_1}^2 = F_{átl} \cdot y$$

$$\frac{1}{2} m \cdot {v_1}^2 = \frac{F_{max}}{2} \cdot y$$

$$\frac{1}{2} m \cdot {v_1}^2 = \frac{6{,}6 \cdot 10^7 \cdot y \cdot \frac{N}{m}}{2} \cdot y$$

$$0{,}6\ kg \cdot \left(3{,}15\ \frac{m}{s}\right)^2 = 6{,}6 \cdot 10^7 \cdot \frac{N}{m} \cdot y^2$$

$$y = 0{,}3\ mm$$

$$F = 6{,}6 \cdot 10^7 \cdot y \cdot \frac{N}{m}$$

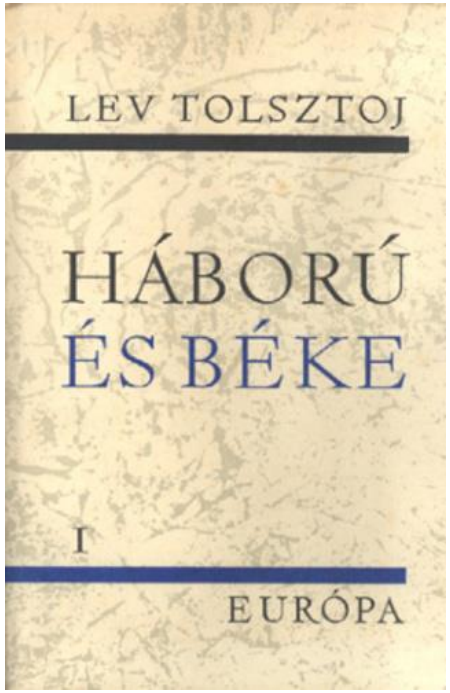
$$F_{max} \approx 20.000\ N$$

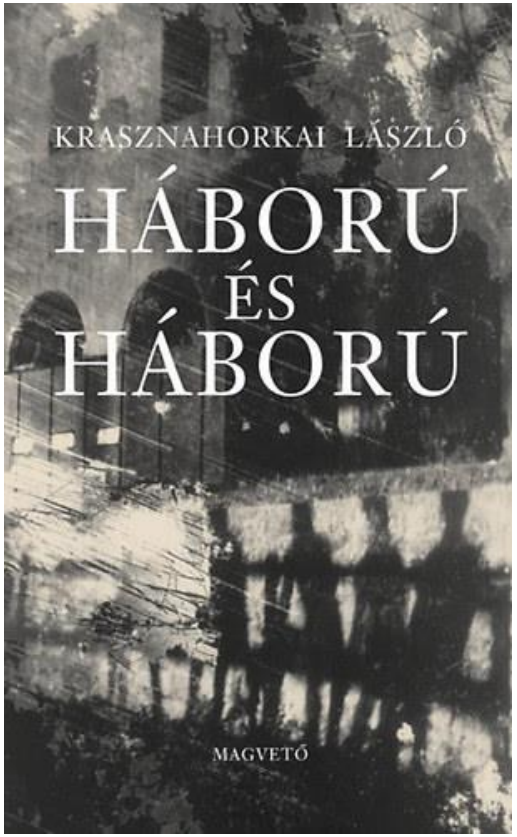
Lavór víz

https://www.youtube.com/watch?v=fwZUz_UHc4Y

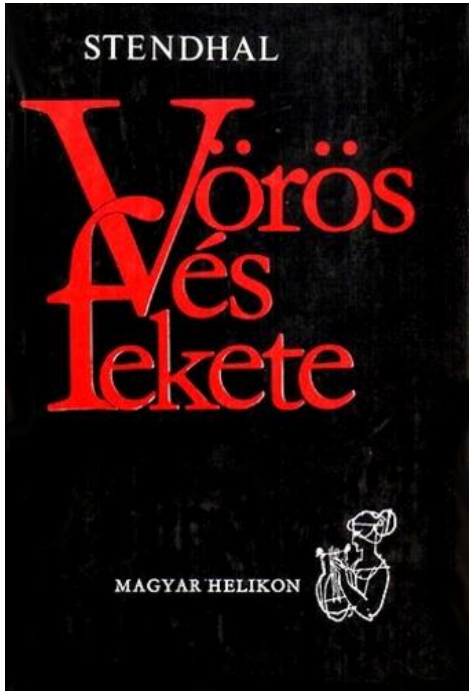
Bornyitás


Alinea Kiadó
Jane Austen
Büszkeség és balítélet
A 200 éves regény
JUBILEUMI KIADÁSA
új magyar fordításban


LEV TOLSZTOJ
HÁBORÚ ÉS BÉKE
I
EURÓPA

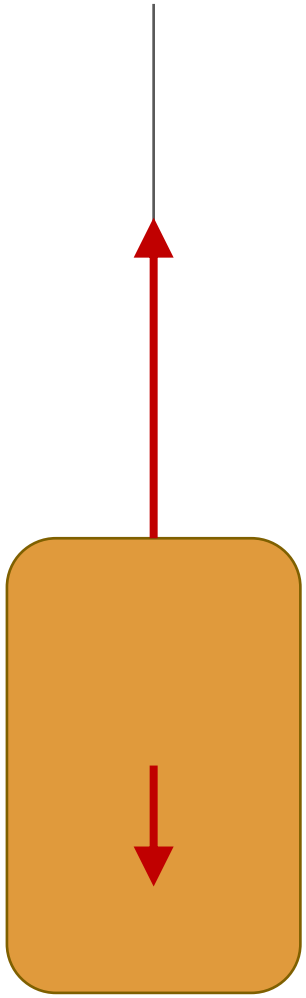

KRASZNAHORKAI LÁSZLÓ
HÁBORÚ ÉS HÁBORÚ
MAGVETŐ


TOM and JERRY™

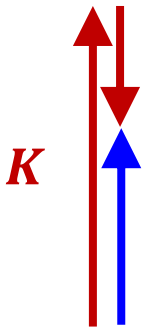

STENDHAL
Vörös és fekete
MAGYAR HELIKON


Stan & Pan

Tuskó és cérna

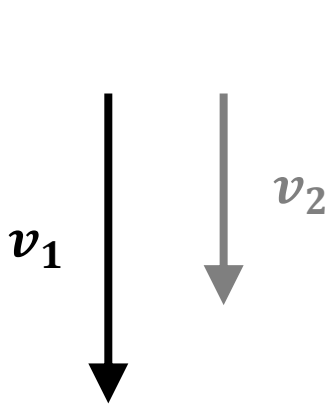


$F_{er} = ?$



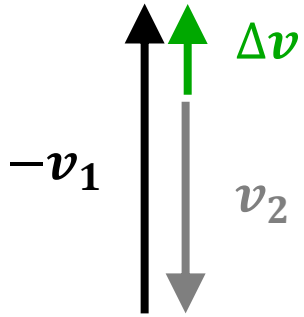
$F_{er} = m \cdot a$

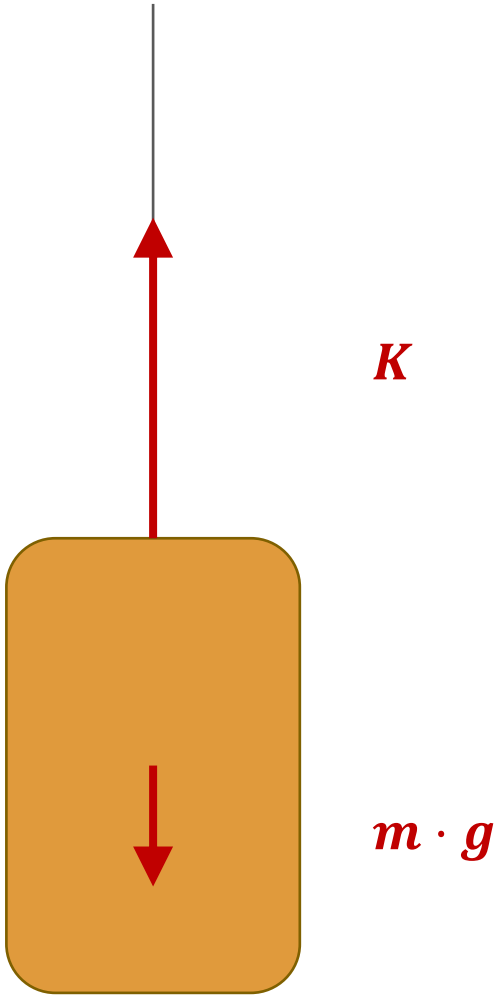
Tuskó és cérna – lefelé haladva megállítjuk

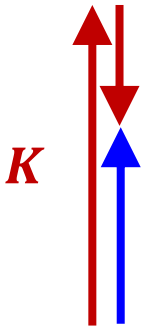


$$\Delta v = v_2 - v_1$$

$$\Delta v = v_2 + (-v_1)$$

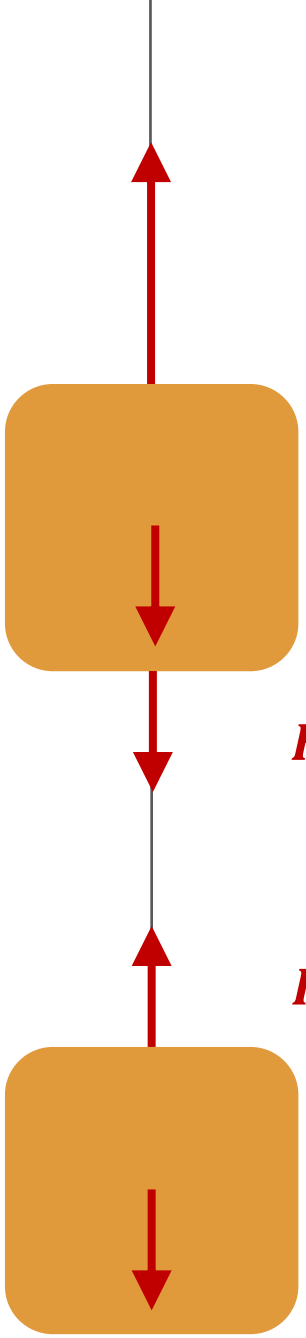






$$F_{er} = m \cdot a$$

Tuskók és cérnák



$K_2 = K_1 + m \cdot g$

$m \cdot g$

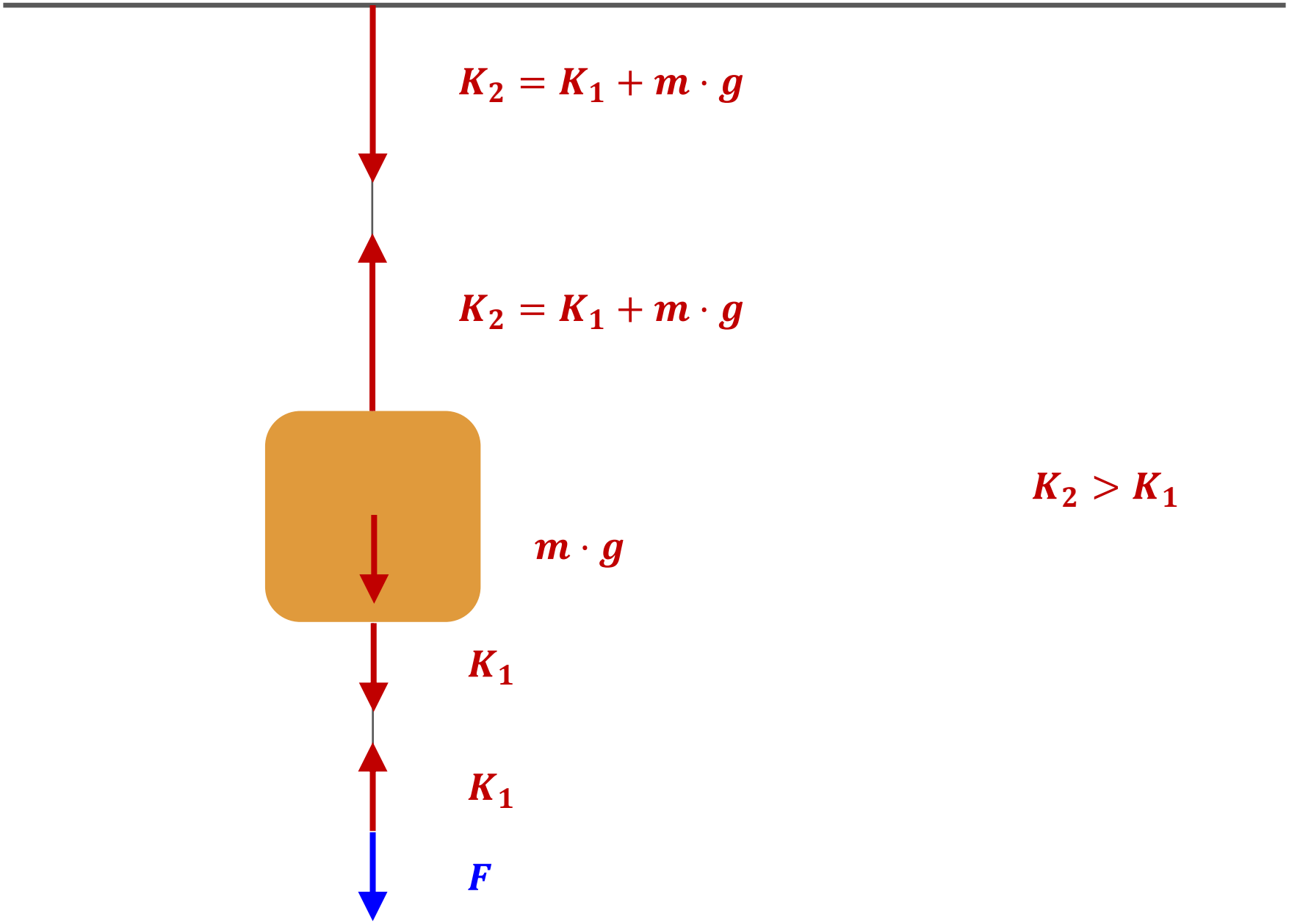
K_1

K_1

$m \cdot g$

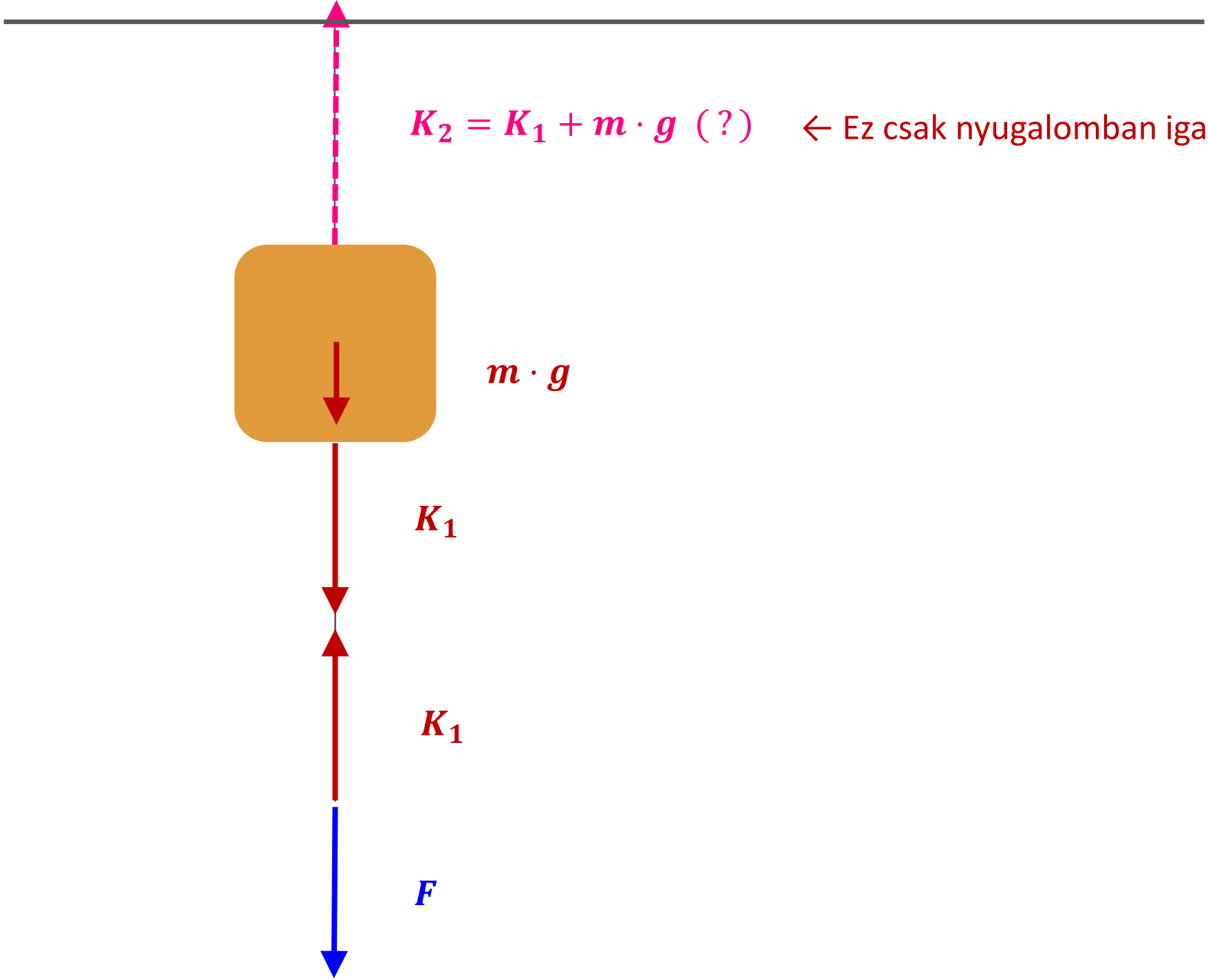
$K_2 > K_1$

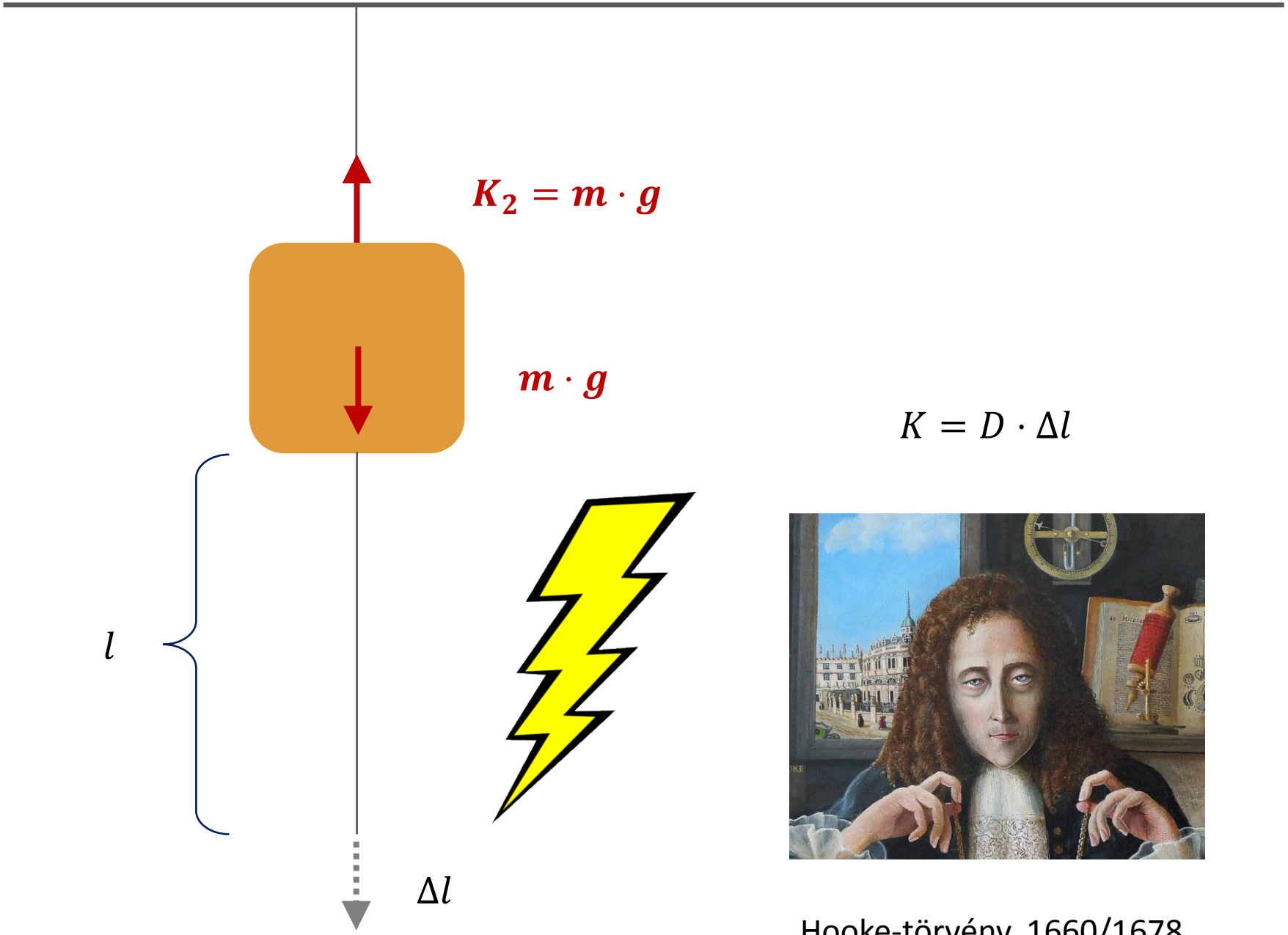
Tuskó és cérnák - felakasztva



$K_2 > K_1$

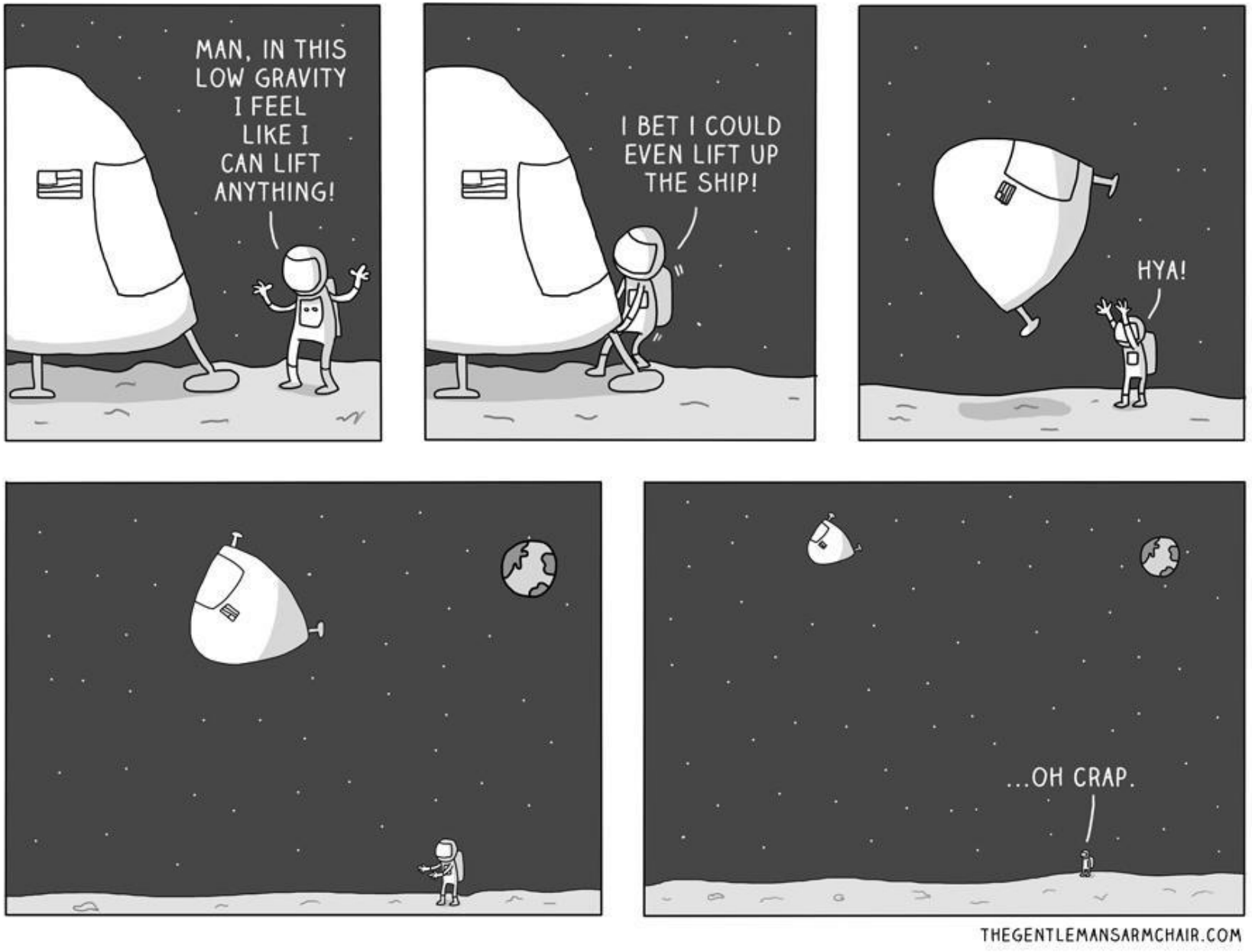
Tuskó és cérnák – felakasztva, megrántva


$K_2 = K_1 + m \cdot g$ (?)
← Ez csak nyugalomban igaz!
$m \cdot g$
K_1
K_1
F



$$K = D \cdot \Delta l$$

Hooke-törvény, 1660/1678



Köszönöm a figyelmet!