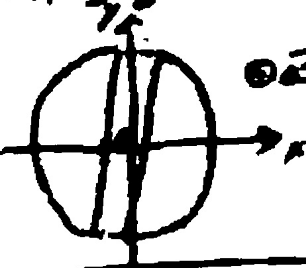
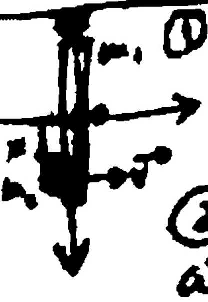
Conservazione momento angolare



$L_0 = I\omega_0 = \frac{m_1 r^2}{2}\omega_0 = L_1 = \frac{m_1 r^2}{2}\omega + m_2 r^2 \omega$

$\frac{m_1 r^2 \omega_0}{2} = r^2\omega\left(\frac{m_1}{2}+m_2\right)$ $\omega = \frac{m_1\omega_0}{m_1+2m_2} = 4.5 \frac{rad}{s}$



① $m_2 v = (m_1+m_2)v_{cm}$ $v_{cm} = \frac{m_2}{m_1+m_2}v$ $r_{cm} = \frac{x m_2}{m_1+m_2}$

$(x - r_{cm}) m_2 v = I\omega = \left(\frac{m_1 \ell^2}{12} + r_{cm}^2 m_1 + m_2(x-r_{cm})^2\right)\omega$

② $m_1 = m_2 = m$ $x = r$ $r m v = I\omega = \left(\frac{m\ell^2}{12} + m r^2\right)\omega$

$\omega = \frac{rv}{\frac{\ell^2}{12}+r^2}$ $J = \Delta p = m\omega r - mv$

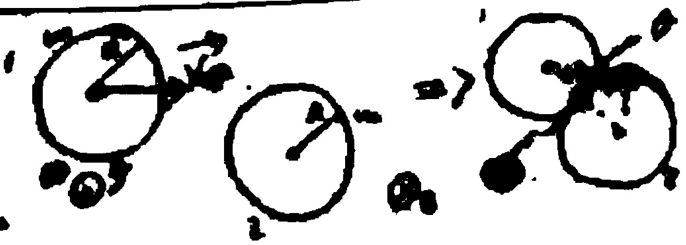
$J_x = \Delta p_x = -m_2 v$

$I\omega = I'\omega'$ $\frac{m_1\ell^2}{12}\omega = \left(\frac{m_1\ell^2}{12}+\frac{m_2\ell^2}{4}\right)\omega'$ $\omega' = \frac{m_1\omega}{m_1+3m_2}$

$J_y = \Delta p_y = m_2\omega'\frac{\ell}{2}$ $J = \sqrt{J_x^2+J_y^2}$ $\theta = \arctan\frac{J_y}{J_x}$

$I\omega = I'\omega'$ $\frac{1}{2}m_1R^2\omega = \left(\frac{1}{2}m_1R^2 + m_2 d^2\right)\omega'$ $\omega' = \frac{m_1R^2\omega}{m_1R^2+2m_2d^2}$

$J = m_2\sqrt{2gh}$ Impulso angolare $= Jd$



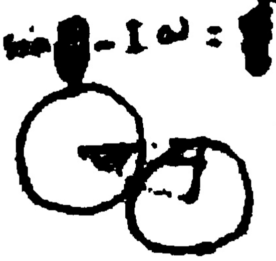
1: m, R, $v = v_0$, $\omega = 0$

2: m, R, $v = 0$, $\omega = 0$

1,2: $v = v_{cm}$, ω

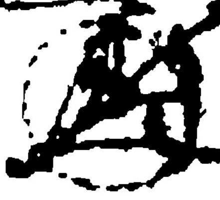
$m v = 2m v_{cm}$ $v_{cm} = \frac{v}{2}$ $P_{cm}: 0$ $L_0 = mRv\sin\theta - I\omega$

$L_f := 0$ $\Rightarrow$ $Rmv = \frac{mR^2}{2}\omega$ $\omega = \frac{2v\sin\theta}{R}$ $\omega = \frac{v}{R}$



$2R\sin\theta = R$ $\sin\theta = \frac{1}{2}$ $\theta = \frac{\pi}{6}$

$T = 2\pi\frac{R}{v}$ $T^2 = \frac{4\pi^2}{GM}R^3$



$p = m v_{cm} = 0$ $L = 3Rmv$

$v = \sqrt{\frac{G}{R}(\ldots)}$

$T = 2\pi\frac{R}{v}$

E_p $\frac{1}{\mu} = \frac{1}{M}+\frac{1}{m} = \frac{M+m}{Mm}$ $\mu = \frac{Mm}{M+m}$ $E_p = 3 \ldots$