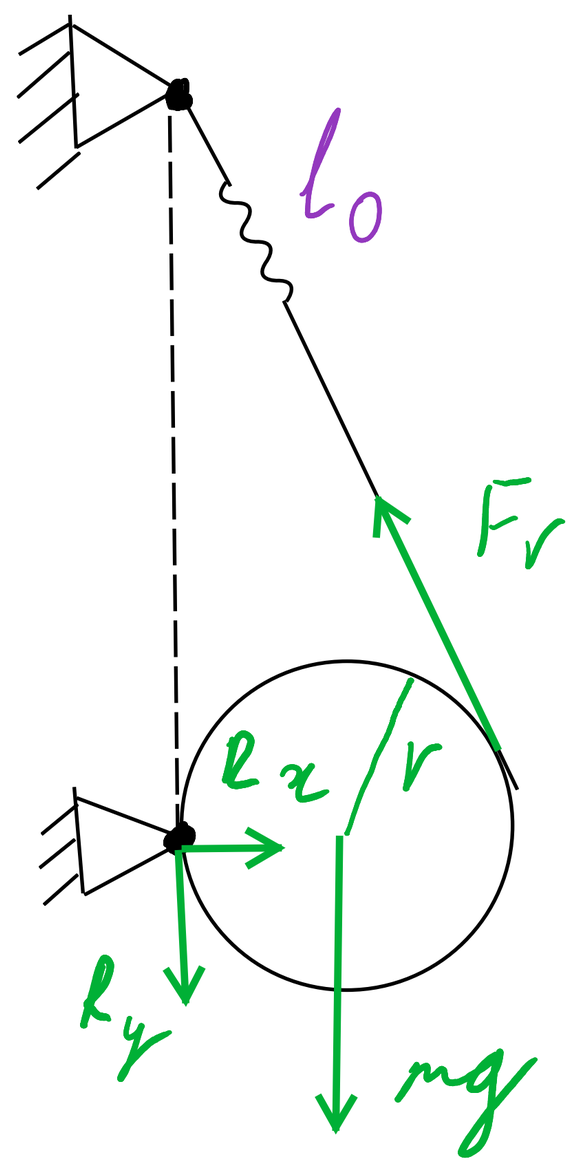
Task: Find an angular velocity, when the mechanism reaches -90 degrees angle

Task goal:
To show how to find work in different ways

Research Object:
Cylinder "1"

Motion:
"1" - rotation motion



Conditions:

$\varphi_0 = 0$ $\quad \varphi_1 = -90^\circ$

$\dot{\varphi} = 0$ $\quad \dot{\varphi}_1 = ?$

$t = 0$ $\quad t_1 - ?$

Kinemtatics:

$v_1 = 2rw$

Force Analysis:

mg ; $F_r = c(l - l_0)$; R_y ; R_x ; $J_{center} \rightarrow J_{axis} = J_r = J_0 + mr^2$

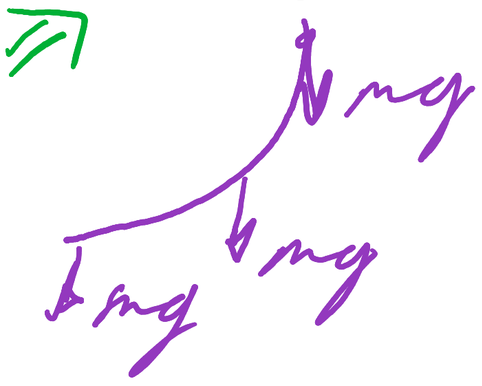
Solution:

$T_2 - T_1 = A_{12}$

$T_1 = 0$; $T_2 = \frac{J_r \omega^2}{2} \Rightarrow T_1 - T_0 = \frac{J\omega^2}{2}$

too complicated

$A = A^G \rightarrow a) \int_0^{0.5\pi r} mg \cos(g \hat{} ds) ds$



$b) M(\bar{g}) = mgr\cos\varphi \Rightarrow$

$\Rightarrow \partial A / M(\bar{g}) = M(\bar{g})\, d\varphi$

$A \doteq \int_0^{\pi/2} mgr\cos\varphi\, d\varphi$ → good

$c) A^G = \Pi_1 - \Pi_0 = mgr$ → good

$A^{F_r} = \int_0^t F_r\, df \cos(f_r \hat{} ds)$ → complicated

$\Pi = -A_r = \frac{c(l^2 - l_0)}{2}$ → good

$\frac{J\omega^2}{2} = mgr + \frac{c(l^2 - l_0)}{2} \Rightarrow \omega$

3 ways, how to find a work. a) and b) are applicable for non potential forces