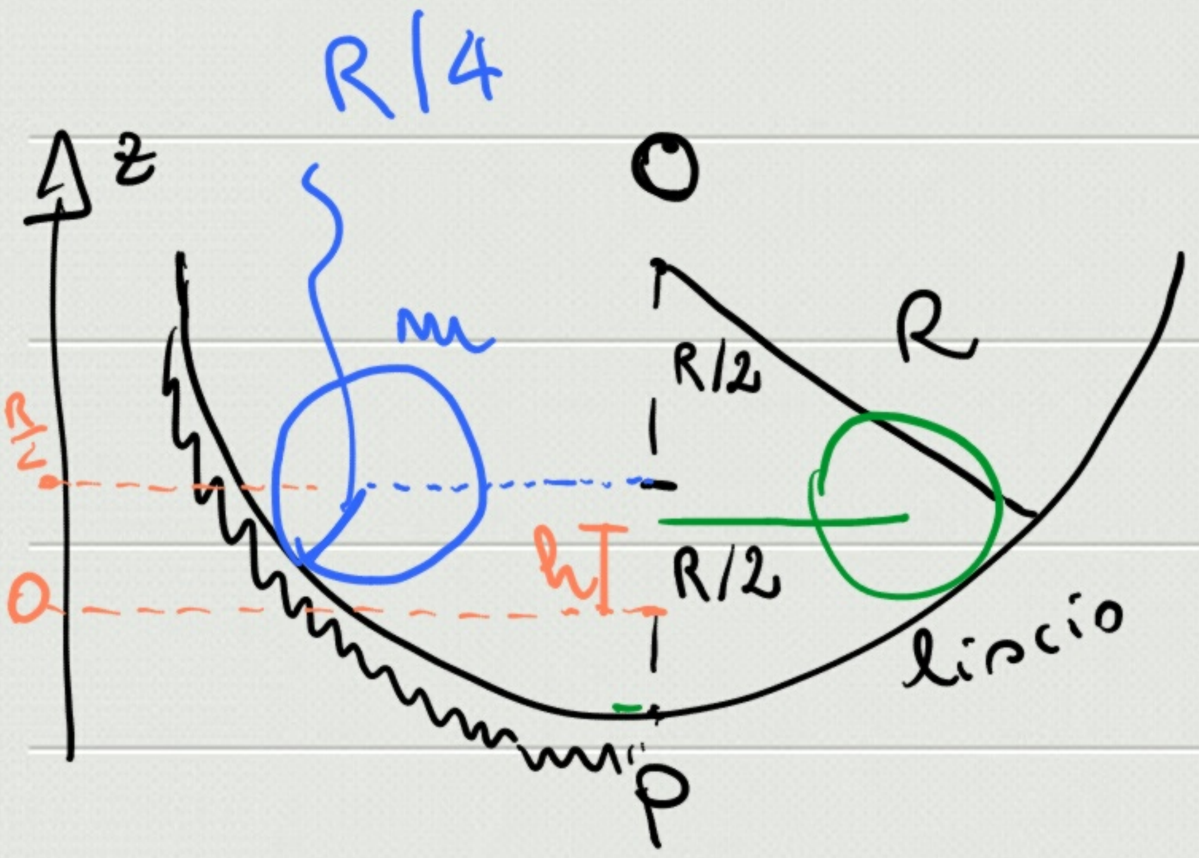

$v_{CM,0} = \omega_0 = 0$

Rotola senza strisciare

$h, \omega_{fm} = ?$

$$E_{m,i} = E_{m,f} \Rightarrow E_{p,im} = E_{k,fm}$$

$$mg\frac{R}{4} = \frac{1}{2}mv_{CM}^2 + \frac{1}{2}I_{CM}\omega^2 \qquad \left(v_{CM} = \omega\frac{R}{4}\right)$$

$$\Rightarrow mg\frac{R}{4} = \frac{1}{2}m\omega^2\frac{R^2}{16} + \frac{1}{2}\left(\frac{1}{2}mR^2\right)\omega^2$$

$$\Rightarrow g = \omega^2 R\left(\frac{1}{8} + \frac{1}{16}\right) \Rightarrow \boxed{\omega = 4\sqrt{\frac{g}{3R}}}$$

ω_{fm}

$$E_m = \text{const}$$

$$\frac{1}{2} m v_{cm}^2 + \cancel{\frac{1}{2} I_{cm} \omega^2} = \cancel{\frac{1}{2} I_{cm} \omega^2} + mgh$$

$$h_{min} = 0$$

$$\frac{1}{2} \cancel{m} \omega^2 \frac{R^2}{16} = \cancel{m} g h$$

$$\Rightarrow h = \frac{\omega^2 R^2}{32 g} = \frac{\cancel{16} g}{3 \cancel{R}} \frac{R^{\cancel{4}}}{\cancel{32} g} = \frac{R}{6}$$