

Translational + Rotational KE

- Consider a cylinder with radius R and mass M , rolling w/o slipping down a ramp. Determine the ratio of the translational to rotational KE.

Translational: $K_T = \frac{1}{2} M v^2$

Rotational: $K_R = \frac{1}{2} I \omega^2$

use $I = \frac{1}{2} M R^2$ and $\omega = \frac{v}{R}$

Rotational: $K_R = \frac{1}{2} (\frac{1}{2} M R^2) (v/R)^2$

$$= \frac{1}{4} M v^2$$

$$= \frac{1}{2} K_T$$

