

University Physics 1A

Alvin Lin

November 20th, 2017

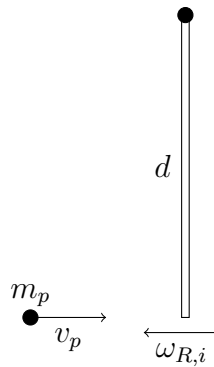
Angular Momentum

Angular Momentum:

$$L = I\omega = \vec{r} \times m\vec{v}$$

Example

A thin rod of mass M_R and length d is pivoted at one end and can rotate without friction along a horizontal surface. The diagram is a top view. Initially it is rotating clockwise at $\omega_{R,i}$. A piece of putty of mass m_p slides without friction toward the end of the rod as shown with a speed of v_p . The putty collides and sticks to the rod at the very end. What is the final angular velocity of the rod and putty?



$$\begin{aligned} I_{rod}\omega_{R,i} - (dm_p v_p) &= I_{rod \text{ and putty}}\omega_f \\ \frac{1}{3}M_R d^2 - dm_p v_p &= (\frac{1}{3}M_R d^2 + m_p d^2)\omega_f \\ \omega_f &= \frac{\frac{1}{3}M_R d^2 - dm_p v_p}{\frac{1}{3}M_R d^2 + m_p d^2} \end{aligned}$$

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at alvin@omgimanerd.tech