

parallel axis  
theorem

$$J_c = R_o^2 = J_{\text{bar}} + 2 * J_{\text{cone}} + 2 * m \cdot R_c^2$$

The diagram illustrates the parallel axis theorem for a rectangular bar of mass \$m\$ and radius \$R\_o\$. It is shown as a rectangle divided into three horizontal sections. The top section is a triangle, the middle section is a rectangle, and the bottom section is another triangle. The center of mass is at the center of the middle rectangle. The distance from the center of mass to the left edge is labeled \$R\_c\$. The total radius \$R\_o\$ is the distance from the left edge to the right edge. The equation \$J\_c = R\_o^2\$ is equated to the sum of the moment of inertia of the bar about its center of mass (\$J\_{\text{bar}}\$) and twice the moment of inertia of two cones (one on each side) about their central axes.

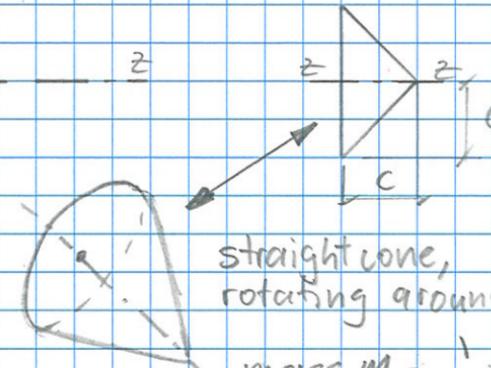
$R_c$

$R_o$

$R_c$

$R_o$

$R_c$



straight cone,  
rotating around its central axis

$$\text{mass } M = \frac{1}{3} \pi r^2 c \cdot \rho$$

$$J_{\text{cone}} = \frac{3}{10} M \cdot c^2$$

(formulas from eng.  
handbook)