

Moment of Inertia

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Abstract

This paper presents an equation to calculate the moment of inertia of a system of particles with respect to the unit position vector $\hat{\mathbf{r}}_i$.

The moment of inertia of a system of particles with respect to the unit position vector $\hat{\mathbf{r}}_i$, is given by:

$$I = \sum_i m_i (\hat{\mathbf{r}}_i \cdot \mathbf{r}_i)$$

where m_i is the mass of the i -th particle, $\hat{\mathbf{r}}_i$ is the unit position vector of the i -th particle, and \mathbf{r}_i is the position of the i -th particle ($\hat{\mathbf{r}}_i$ and \mathbf{r}_i are perpendicular to the axis of rotation)