Moment of Inertia

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Abstract

In this paper an equation to calculate the moment of inertia of a system of biparticles is presented.

The moment of inertia of a system of particles, is given by:

$$I_i = \sum_i m_i \mathbf{r}_i^2$$

The moment of inertia of a system of biparticles, is given by:

$$I_{ij} = \sum_i \sum_{j>i} m_i m_j \left(\mathbf{r}_i - \mathbf{r}_j\right)^2$$

A system of particles forms a system of biparticles, and from the above equations the following relation can be obtained:

$$I_{ij} = M_i I_i^{cm}$$

where I_{ij} is the moment of inertia of the system of biparticles, M_i is the mass of the system of particles, and I_i^{cm} is the moment of inertia of the system of particles relative to the center of mass.