The Study of Moment of Inertia of any Polyhedron by the Use of Mass Projection of the Polyhedron

Teerakosone, Phurich (School: Nakhon Sawan School)

Moment of inertia is a quantity measuring of the resistance of a body to the angular acceleration. The quantity can be commonly calculated using integral calculus of which could be very complicated. This project aims to simplify the complex calculus expression into a novel simple algebraic analytical formula suitable for any polyhedron with known faces and coordinates of the vertices. The formula is derived from the concept of compounding of shapes. Polygons, pyramids, and polyhedra can be basically formed by many triangles. Shifting the object from 2D to 3D plane is a major concern. However, it can be demonstrated in this work that, by using mass projection technique, the shifting contributes no effect to the moment of inertia calculation. The final result is algebraic and supports both solid and hollow body. The novel formulas provide the alternative mean of calculating moment of inertia of complex shapes without using calculus.

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