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Estimation of Principal Axes of Inertia

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In the previous studies concerning the inertia characteristics of a rigid body, the components of the inertia tensor, that is, the moments and the products of inertia were mainly estimated. However, it is advantageous to obtain the principal axes and the principal moments of inertia of a rigid body. This paper presents a new experimental method to measure the principal axes of a rigid body without the principal axis transformation. A rigid body is suspended from a vertical axle by a slender rod. Each end of the rod has a universal joint. And the axle rotates with a constant angular velocity. The experimental results for a cylinder and a rectangular prism agreed well with the theoretical results. And the principal axes of a golf club head were estimated experimentally.

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