Module 5 - Rotation Systems

ME3050 - Dynamics Modeling and Controls

Mechanical Engineering

Tennessee Technological University

Topic 1 - The Dynamics of Rotation

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- Newton's Second in Rotation
- Fixed Axis Rotation
- Energy of Rotation
- Engineering Applications

Newton's Second in Rotation

In a system involving rotation Newton's Second Law equates the mass moment of inertia to the angular acceleration of a rigid body.

Also, the moment of inertia of an object depends on not only its mass but the geometry with respect to the center of rotation and can be thought of a the rotational equivalent of mass.

$$\Sigma M = I\alpha$$

Newton's Second in Rotation

Fixed Axis Rotation

Images: T.Hill

Energy of Rotation

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Engineering Applications