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Rigid Body Dynamics: Student Misconceptions and Their Diagnosis

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As pointed out by a rich body of research literature, students subjected to traditional instruction in math, science and engineering, often do not adequately resolve the misconceptions that they either bring to a subject or develop while studying a subject. That literature includes the field of particle mechanics, but does not include rigid body mechanics. This paper presents results of research on the important, but troublesome-to-students, concepts in rigid body mechanics so that instructors in undergraduate dynamics courses can be more informed in the nuances and intricacies of student learning of this subject. Student focus groups conducted at three different universities have been used in this research, followed up by testing of students at an additional four universities. The results are being used in the development of an easy-to-administer, easy-to-score assessment instrument that can reveal whether these common misconceptions have been affected by instruction. The instrument, called the Dynamics Concept Inventory is patterned after the Force Concept Inventory (FCI) instrument of Halloun and Hestenes, which is in wide use in physics education.

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