Flexible Multibody Dynamics

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Monografía

The author developed this text over many years, teaching graduate courses in advanced dynamics and flexible multibody dynamics at the Daniel Guggenheim School of Aerospace Engineering of the Georgia Institute of Technology. \00A0 The book presents a unified treatment of rigid body dynamics, analytical dynamics, constrained dynamics, and flexible multibody dynamics. A comprehensive review of numerical tools used to enforce both holonomic and nonholonomic constraints is presented. Advanced topics such as Maggi\2019s, index-1, null space, and Udwadia and Kalaba\2019s formulations are presented because of their fundamental importance in multibody dynamics. Methodologies for the parameterization of rotation and motion are discussed and contrasted. Geometrically exact beams and shells formulations, which have become the standard in flexible multibody dynamics, are presented and numerical aspects of their finite element implementation detailed. Methodologies for the direct solution of the index-3 differential-algebraic equations characteristic of constrained multibody systems are presented. It is shown that with the help of proper scaling procedures, such equations are not more difficult to integrate than ordinary differential equations. \00A0 This book is illustrated with numerous examples and should prove valuable to both students and researchers in the fields of rigid and flexible multibody dynamics

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