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Nota di contenuto	MULTIB ODY DYNAMICS WITH UNILATERAL CONTACTS; CONTENTS; PART 1: Theory; 1 Introduction; 1.1 Modeling Mechanical Systems; 1.2 Single-Contact Dynamics; 1.3 Multiple-Contact Dynamics; 2 Multibody Kinematics; 2.1 Geometry and Definitions; 2.2 Time Derivations; 2.3 Velocities and Accelerations; 2.4 Recursive Methods; 3 Dynamics of Rigid Body Systems; 3.1 Equations of Motion; 3.2 Nonlinear Applied Forces; 3.2.1 Some Remarks; 3.2.2 Couplings by Force Laws; 3.2.3 Some Examples; 4 Contact Kinematics; 4.1 Contour Geometry; 4.2 The Distance between Bodies 4.3 The Relative Velocities of the Contact Points4.4 Changes of the Relative Velocities; 4.5 Evaluation of the Contact Kinematics; 4.6 Example: Contact Problem of a Parabola and a Straight Line; 5 Multiple Contact Configurations; 5.1 Superimposed Constraints; 5.2 Minimal Coordinates and Friction; 5.3 Example: The Sliding Rod; 5.4 Example: A Pantograph Mechanism; 6 Detachment and Stick-Slip Transitions; 6.1 Contact Law for Normal Constraints; 6.2 Coulomb's Friction Law; 6.3 Decomposition of the Tangential Characteristic; 6.4 The Linear

Complementarity Problem

6.5 Example: The Detachment Transition6.6 Example: The Stick-Slip Transition; 7 Frictionless Impacts by Newton's Law; 7.1 Assumptions and Basic Equations; 7.2 Newton's Impact Law; 7.3 Energy Considerations; 7.4 Example: Impact between Two Point Masses; 7.5 Example: Double Impact on a Rod; 8 Impacts with Friction by Poisson's Law; 8.1 Assumptions and Basic Equations; 8.2 Phase of Compression; 8.3 Phase of Expansion; 8.4 Energy Considerations; 8.5 Conservation of Energy; 8.6 Comparison of Newton's and Poisson's Laws; 8.7 Decomposition of an Asymmetric Characteristic

8.8 An LCP Formulation for Compression8.9 An LCP Formulation for Expansion; 8.10 Remarks on Impacts with Friction; 8.11 Example: Double Impact on a Rod; 8.12 Example: Poisson's Law in the Frictionless Case; 8.13 Example: Reversible Tangential Impacts; 8.14 Example: Poisson's Law and Coulomb Friction; 9 The Corner Law of Contact Dynamics; PART 2: Applications; 10 Introduction; 11 Applications with Discontinuous Force Laws; 11.1 Hammering in Gears; 11.1.1 Modeling; 11.1.2 Evaluation of the Simulations; 11.1.3 Results 11.2 Overloads in Gears due to Short-circuit and Malsynchronization in a Generator11.2.1 Introduction; 11.2.2 The Equations of Motion; 11.2.3 Solution Procedure; 11.2.4 Force Elements; 11.2.5 Synchronous Generator; 11.2.6 Simulation and Results; 12 Applications with Classical Impact Theory; 12.1 Gear Rattling; 12.1.1 Introduction; 12.1.2 Gearbox Model; 12.1.3 Results; 12.1.4 Parameter Dependence of Mean Values; 12.1.5 Experimental Results; 12.2 A Ship-Turning Gear; 12.3 Dynamics of a Synchronizer; 12.3.1 Introduction; 12.3.2 Operation of a Synchronizer

12.3.3 Mechanical and Mathematical Models

Sommario/riassunto

As mechanical systems become more complex so do the mathematical models and simulations used to describe the interactions of their parts. One area of multibody theory that has received a great deal of attention in recent years is the dynamics of multiple contact situations occurring in continuous joints and couplings. Despite the rapid gains in our understanding of what occurs when continuous joints and couplings interact, until now there were no books devoted exclusively to this intriguing phenomenon. Focusing on the concerns of practicing engineers, Multibody Dynamics with Unilateral Contact