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Titolo	Global Formulations of Lagrangian and Hamiltonian Dynamics on Manifolds : A Geometric Approach to Modeling and Analysis / / by Taeyoung Lee, Melvin Leok, N. Harris McClamroch
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Soggetti	Dynamics Ergodic theory Vibration Dynamical systems System theory Computer mathematics Dynamical Systems and Ergodic Theory Vibration, Dynamical Systems, Control Systems Theory, Control Computational Mathematics and Numerical Analysis
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Nota di contenuto	Mathematical Background -- Kinematics -- Classical Lagrangian and Hamiltonian Dynamics -- Langrangian and Hamiltonian Dynamics on (S1)n -- Lagrangian and Hamiltonian Dynamics on (S2)n -- Lagrangian and Hamiltonian Dynamics on SO(3) -- Lagrangian and Hamiltonian Dynamics on SE(3) -- Lagrangian and Hamiltonian Dynamics on Manifolds -- Rigid and Mult-body Systems -- Deformable Multi-body Systems -- Fundamental Lemmas of the Calculus of Variations -- Linearization as an Approximation to Lagrangian Dynamics on a Manifold.
Sommario/riassunto	This book provides an accessible introduction to the variational formulation of Lagrangian and Hamiltonian mechanics, with a novel

emphasis on global descriptions of the dynamics, which is a significant conceptual departure from more traditional approaches based on the use of local coordinates on the configuration manifold. In particular, we introduce a general methodology for obtaining globally valid equations of motion on configuration manifolds that are Lie groups, homogeneous spaces, and embedded manifolds, thereby avoiding the difficulties associated with coordinate singularities. The material is presented in an approachable fashion by considering concrete configuration manifolds of increasing complexity, which then motivates and naturally leads to the more general formulation that follows. Understanding of the material is enhanced by numerous in-depth examples throughout the book, culminating in non-trivial applications involving multi-body systems. This book is written for a general audience of mathematicians, engineers, and physicists with a basic knowledge of mechanics. Some basic background in differential geometry is helpful, but not essential, as the relevant concepts are introduced in the book, thereby making the material accessible to a broad audience, and suitable for either self-study or as the basis for a graduate course in applied mathematics, engineering, or physics.