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The subject of geometric numerical integration deals with numerical integrators that preserve geometric properties of the flow of a differential equation, and it explains how structure preservation leads to improved long-time behavior.

Geometric numerical integration illustrated by the St

Geometric numerical integration (since 1986), see [3, 7, 6] structure-preserving integration of differential equations, Hamiltonian, reversible, divergence-free, Poisson systems.

Geometric Numerical Integration - UNIGE

Numerical Geometric Integration Ernst Hairer Univ ersit e de Gen ev Marc h 1999 Section de math ematiques Case postale 240 CH-1211 Gen ev e 24. Con ten ts I ... Structure Preservation. 72 V.2.1 Reversible Problems and Symmetric Methods. 72 V.2.2 ... Numerical Experiments This chapter in

Numerical Geometric Integration

ifold. The design and implementation of numerical methods that respect geometric invariants is the business of GNI. Since its emergence, GNI has become the new paradigm in numerical solution of ODEs, while making significant inroads into numerical PDEs. As often, yesterday's revolutionaries became the new establishment.

Why geometric numerical integration? - DAMTP

Math 692A: Geometric Numerical Integration Melvin Leok Mathematics, Purdue University. ... Main Goal of Geometric Integration: Structure preservation in order to reproduce long time behavior. ... Provides a systematic framework to construct structure-preserving numerical schemes that are consistent with the underlying geometry.

Math 692A: Geometric Numerical Integration

Geometric Numerical Integration for Complex Dynamics of Tethered Spacecraft Taeyoung Lee , Melvin Leoky, and N. Harris McClamroch Abstract "This paper presents an analytical model and a geometric numerical integrator for a tethered spacecraft model that is composed of two rigid bodies connected by an elastic

Geometric Numerical Integration for Complex Dynamics of

Dirac structures are of interest as they can directly incorporate Dirac constraints that arise in degenerate Lagrangian systems [16, 18, 20, 22, 28], interconnected systems [10, 45], and nonholonomic systems [6], and thereby provide a unified geometric framework for studying such problems.

VARIATIONAL AND GEOMETRIC STRUCTURES OF DISCRETE DIRAC

Request PDF on ResearchGate | On Jan 1, 2006, Ernst Hairer and others published Geometric numerical integration. Structure-preserving algorithms for ordinary differential equations. 2nd ed

Geometric numerical integration. Structure-preserving

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Geometric Numerical Integration Structure Preserving

Special Issue on 'Geometric Numerical Integration of Differential Equations' ... has been found that preserving geometric structure is the key to constructing reliable methods; well-known examples are methods that preserve positivity (for systems of conservation laws)

Geometric Numerical Integration of Differential Equations

The subject of this book is numerical methods that preserve geometric properties of the flow of a differential equation: symplectic integrators for Hamiltonian systems, symmetric integrators for reversible systems, methods preserving first integrals and numerical methods on manifolds, including Lie group methods and integrators for constrained mechanical systems, and methods for problems with highly oscillatory solutions.

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