Momentum maps and Hamiltonian reduction

Birkhäuser - Openness of momentum maps and persistence of extremal relative equilibria

Description: -
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Global differential geometry
Global analysis (Mathematics)
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At home with
Progress in mathematics (Boston, Mass.) -- vol. 222
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Hamiltonian mechanics

Note that the values of scalar potential and vector potential would change during a , and the Lagrangian itself will pick up extra terms as well; But the extra terms in Lagrangian add up to a total time derivative of a scalar function, and therefore won't change the Euler—Lagrange equation. The second part conveys an introduction to Brownian motion, presenting some of its fundamental properties, defining the Wiener measure and discussing the weak and strong Markov properties.

Openness of momentum maps and persistence of extremal relative equilibria

We prove that for every proper Hamiltonian action of a Lie group G in finite dimensions the momentum map is locally G-open relative to its image i. As a result, we recover various well-known results concerning equivalence of momentum maps including Alekseev-- Ginzburg--Weinstein linearization theorem and Alekseev--Malkin--Meinrenken equivalence theorem between quasi-Hamiltonian spaces and Hamiltonian loop group sapces. The Hamiltonian in this case is known as a sub-Riemannian Hamiltonian.

Momentum Maps and Hamiltonian Reduction (豆瓣)

A system of equations in n coordinates still has to be solved. Hamilton's equations usually do not reduce the difficulty of finding explicit solutions, but they still offer some advantages: Important theoretical results can be derived, because coordinates and momenta are independent variables with nearly symmetric roles. This Hamiltonian consists entirely of the.

Hamiltonian mechanics

In the case where the cometric is degenerate at every point q of the configuration space manifold Q, so that the of the cometric is less than the dimension of the manifold Q, one has a. Like Lagrangian mechanics, Hamiltonian mechanics is equivalent to Newton's laws of motion in the framework of classical mechanics. The Lagrangian and Hamiltonian approaches provide the groundwork for deeper results in the theory of classical mechanics, and for formulations of quantum mechanics.

Momentum Maps and Hamiltonian Reduction (豆瓣)

More precisely, we carry out the following program: 1 Define and study properties of quasi-symplectic groupoids; 2 Study the momentum map theory defined by a quasi-symplectic groupoid.

The Momentum Map, Symplectic Reduction and an Introduction to Brownian Motion

A further generalization is given by. A Hamiltonian may have multiple conserved quantities G i. The Hamiltonian is the of the Lagrangian when holding q and t fixed and defining p as the dual variable, and thus both approaches give the same equations for the same generalized momentum.

Momentum Maps and Hamiltonian Reduction

Instead of simply looking at the of over a , Hamiltonian mechanics can be formulated on general. The integrability of Hamiltonian vector fields is an open question. .

The Momentum Map, Symplectic Reduction and an Introduction to Brownian Motion

By , each symplectomorphism preserves the on the. The time derivative of q is the velocity, and so the second Hamilton equation means that the particle's velocity equals the derivative of its kinetic energy with respect to its momentum.

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