Ann. Acad. Rom. Sci.
Ser. Math. Appl.
ISSN 2066-6594 Vol. 15, No. 1-2/2023

DISSIPATION AND THE INFORMATION CONTENT OF THE DEVIATION FROM HAMILTONIAN DYNAMICS*

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DOI https://doi.org/10.56082/annalsarscimath.2023.1-2.366

Dedicated to Dr. Dan Tiba on the occasion of his 70^{th} anniversary

Abstract

We explain a dissipative version of hamiltonian mechanics, based on the information content of the deviation from hamiltonian dynamics. From this formulation we deduce minimal dissipation principles, dynamical inclusions, or constrained evolution with hamiltonian drift reformulations. Among applications we recover a dynamics generalization of Mielke et al quasistatic rate-independent processes.

This article gives a clear and unitary presentation of the theory of hamiltonian inclusions with convex dissipation or symplectic Brezis-Ekeland-Nayroles principle, presented under various conventions first in [3] arXiv:0810.1419, then in [4] arXiv:1408.3102 and, for the appearance of bipotentials in relation to the symplectic duality, in [2] arXiv:1902.04598v1.

MSC: 70H05, 70H30, 70S05, 74C05, 70G75, 49J40

keywords: convex dissipation, hamiltonian inclusions, symplectic bipotentials, symplectic Brezis-Ekeland-Nayroles principle.

*Accepted for publication on May 1-st, 2023

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