



On the Globalization Problem of Multi-Hamiltonian Formalisms: A Locally Conformal Analysis

Begüm Ateşli

İstanbul Teknik Üniversitesi, Gebze Teknik Üniversitesi

This talk investigates the globalization problem in multi-Hamiltonian formalisms, focusing on how local geometric structures can be extended to global ones through locally conformal analysis.

In Part I, we briefly review the essential ideas of Poisson and Jacobi manifolds and their Hamiltonian dynamics, emphasizing how locally defined Poisson structures may fail to glue together into global ones.

Part II examines the generalization of Poisson and Jacobi algebras to higher-order settings through Nambu–Poisson and Nambu–Jacobi structures. We discuss the extension of the Poisson bracket to multi-brackets, the resulting multi-Hamiltonian vector fields, and the algebraic and geometric structure of dynamics on Nambu manifolds. In this part, we also briefly address bi-Hamiltonian systems within the Nambu–Poisson framework.

In Part III, we turn to the globalization problem in the Nambu–Poisson context. We explore how local Nambu structures can be coherently assembled into global ones and analyze the role of conformal deformations in constructing locally conformally Nambu–Poisson manifolds, providing a higher-order analogue of the conformal globalization mechanism observed in the Poisson case. Finally, we show how local bi-Hamiltonian systems can be globalized within the locally conformal setting.

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İletişim: kayah17@itu.edu.tr