Multicontact formulation for non-conservative field theories

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Abstract

A new geometric structure inspired by multisymplectic and contact geometries, which we call *multicontact structure*, is developed to describe non-conservative classical field theories. Using the differential forms that define this multicontact structure as well as other geometric elements that are derived from them while assuming certain conditions, we can introduce, on the multicontact manifolds, the variational field equations which are stated using sections, multivector fields, and Ehresmann connections on the adequate fiber bundles. Furthermore, it is shown how this multicontact framework can be adapted to the jet bundle description of classical field theories. The field equations are stated in the Lagrangian and the Hamiltonian formalisms and some examples are provided.

Main reference

- M. de León, J. Gaset, M. C. Muñoz-Lecanda, X. Rivas and N. Román-Roy. "Multicontact formulation for non-conservative field theories". *J. Phys. A: Math. Theor.* **56**(2):025201, 2023, DOI: 10.1088/1751-8121/acb575.