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Mathematical Physics

Multisymplectic formalism and the covariant phase

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The formulation of a relativistic dynamical problem as a system of Hamilton equations by respecting the principles of Relativity is a delicate task, because in their classical form the Hamilton equations require the use of a time coordinate, which of course contradicts the Relativity. Two interesting solutions have been proposed during the last century: the covariant phase space and the multisymplectic formalism. These two approaches were inspired at the beginning by different points of view. However, as shown by works by Kijowski-Szczyrba, Forger-Romero and Vitagliano, a synthetic vision of the two theories leads probably to the most satisfactory answer to the basic question of understanding the Hamiltonian structure of relativistic fields theory.

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