

# Darboux type theorems in multisymplectic geometry

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*Abstract of the talk.* Multisymplectic geometry was developed to give a finite-dimensional Hamiltonian description of classical field theory, in analogy to symplectic geometry describing classical mechanics. A key tool in symplectic geometry is the existence of local standard coordinates, assured by the Darboux theorem. This classical theorem, stating that in appropriate coordinates all symplectic forms locally take the form  $dx^1 \wedge dx^2 + \dots + dx^{2n-1} \wedge dx^{2n}$ , fails to naively generalize to the multisymplectic situation (i.e. to non-degenerate closed forms of arbitrary degree). We will determine the necessary and sufficient conditions for Darboux type theorems for multisymplectic manifolds of product and complex types. Then, we will discuss possible obstructions to the  $\omega$ -transitivity of the diffeomorphism groups of these multisymplectic structures.