Symplectic Reduction and Quantum Gauge Theory

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Abstract

The models under consideration arise from lattice approximation of nonabelian gauge theories. On the classical level, they are formulated as Hamiltonian systems endowed with a gauge symmetry and with a natural momentum mapping. First, I will discuss singular Marsden-Weinstein reduction, which yields the stratified reduced phase space. Next, I will present the canonical quantization procedure in this context, and I will mention results on the structure of the field and the observable algebras of these models. For implementing the stratified structure on quantum level I will use the generalized Bargmann-Segal transform for compact Lie groups as developed by B. C. Hall and the concept of a costratified Hilbert space as proposed by J. Huebschmann. Finally, I will discuss a simple exactly solvable example. In the talk, I will comment on reduction after quantization vs. quantization after reduction.