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Invariant reduction for partial differential equations: Poisson brackets

In this talk I will show that, under suitable conditions, finite-dimensional systems describing invariant solutions of PDEs inherit local Hamiltonian operators through a mechanism of invariant reduction, which applies uniformly to point, contact, and higher symmetries. The inherited operators endow the reduced systems with Poisson bivectors that relate constants of invariant motion to symmetries. The induced Poisson brackets agree with those of the original systems, up to sign. At the core of this construction lies the interpretation of Hamiltonian operators as degree-2 conservation laws of degree-shifted cotangent equations.