

**Mokhov, O. I.**

**Compatible Poisson structures of hydrodynamic type and associativity equations.** (English. Russian original) [\[Zbl 0985.37071\]](#)

Bukhshtaber, V. M. (ed.) et al., Solitons, geometry, and topology: on the crossroads. Collected papers dedicated to the 60th birthday of Academician Sergei Petrovich Novikov. Transl. from the Russian. Moscow: MAIK Nauka/Interperiodica, Proc. Steklov Inst. Math. 225, 269-284 (1999); translation from Tr. Mat. Inst. Steklova 225, 284-300 (1999).

The general problem of description of compatible Poisson structures of hydrodynamic type is considered as the theory of integration of the corresponding nonlinear system of partial differential equations. The main hypothesis is that this nonlinear system is integrable in the most general sense. The general two-component case is studied in detail. The corresponding system of hydrodynamic type is rather unusual and does not belong to the well-known classes of integrable homogeneous systems. It is nondiagonalizable, nonlinear, and has double eigenvalues and only two Riemann invariants. In addition, various integrable reductions of the system of nonlinear equations that describes general compatible Poisson structures of hydrodynamic type are studied. Among them, the reductions connected with the associativity equations play an important role. The general nonlinear system that describes compatible Poisson structures of hydrodynamic type is reduced to certain special reductions of the associativity equations described by systems of partial differential equations. It is proved that in the general case they describe a compatible deformation of two special Frobenius algebras. In the two-component case, this problem is reduced to a linear second-order system of partial differential equations with constant coefficients.

For the entire collection see [\[Zbl 0967.00102\]](#).

Reviewer: [Arkadi Berezovski \(Tallinn\)](#)

**MSC:**

- [37K10](#) Completely integrable infinite-dimensional Hamiltonian and Lagrangian systems, integration methods, integrability tests, integrable hierarchies (KdV, KP, Toda, etc.)
- [37K25](#) Relations of infinite-dimensional Hamiltonian and Lagrangian dynamical systems with topology, geometry and differential geometry
- [35Q53](#) KdV equations (Korteweg-de Vries equations)

[Cited in 7 Documents](#)

**Keywords:**

[Poisson brackets](#); [systems of equations of hydrodynamic type](#); [integrable reductions](#)