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Frobenius manifolds, flat F-manifolds and integrable systems of conservation laws

Frobenius manifolds naturally appear in different branches of mathematics including quantum cohomology, singularity theory and the theory of integrable systems. In this brief course we will focus on the crucial role played by Frobenius manifolds (and by certain recent generalizations) in the modern theory of integrable systems.

Lecture 1. "Integrable quasilinear systems of conservation laws".
Semihamiltonian (rich) quasilinear hyperbolic systems. Hamiltonian formalism in local and non local case. Flat pencils of metrics and bi-Hamiltonian structures. An important example: the Dubrovin-Saito construction on the orbit space of a Coxeter group.

Lecture 2. "Frobenius manifolds and integrable hierarchies"
From Frobenius manifolds to flat pencils and back. Integrable deformations: bihamiltonian deformations and bi-Hamiltonian cohomology, integrable dispersive deformations of topological type.

Lecture 3. "Flat F-manifolds and integrable hierarchies".
Flat and bi-flat F-manifolds. An important example: the bi-flat structure on the orbit space of a complex reflection group. A special class of integrable dispersive deformations. The general problem of classification, a general conjecture and a list of open problems.