Monday, December 1, 2025
from 4:45 p.m. to 6:20 p.m. (Moscow time)
room 16-10 and ZOOM translation

Elena A. Kudryavtseva

Topological classification of Hamiltonian systems on two-dimensional symplectic manifolds with generic singularities

The talk is based on a joint work with PhD student V.I. Sidelnikov.

The talk is devoted to Hamiltonian systems with a Bott Hamilton function on smooth two-dimensional symplectic manifolds with generic singularities of the symplectic structure. We assume that the Hamilton function is a Bott function, i.e. it has a finite number of Morse critical points (points of local minima, maxima, and saddle critical points) and a finite number of Bott critical circles. We also assume that the symplectic structure may have 'typical' degenerations on some of the critical circles. It turns out that the Hamiltonian vector field of such a system is well defined and smooth. We obtained a classification of such systems up to Liouville (i.e., fiberwise) and orbital equivalences, as well as stronger equivalence relations that take into account local orientations given by the symplectic structure. Our classifications are obtained in terms of topological invariants of the Hamiltonian systems — the Fomenko molecule (with some marks) up to certain moves (perestroykas). Using these invariants, we obtain a list (containing 99 items) of all Hamiltonian systems with at most two isolated equilibria, up to the equivalence relations under consideration. We also obtained a list (containing 19 items) of all Morse functions of low complexity (at most six) on a pretzel, up to fiberwise equivalence.

SCIENTIFIC SEMINAR
"DIFFERENTIAL GEOMETRY AND APPLICATIONS"

headed by Academician of RAS Anatoly T. Fomenko

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