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Orbital invariants of billiards and systems with non-compact leaves

Currently, integrable billiards and their generalizations are being actively studied. It is well known that billiard books, introduced by Victoria Vedyushkina, model Liouville foliations of many systems of physics, mechanics and geometry.

This report will be devoted to the study of orbital invariants of such billiards. As it turned out, in the neighborhood of any regular leave of such systems, one can introduce action-angle variables and define the rotation functions on the edges of a rough molecule by a classical way. Moreover, for such systems it was possible to find a general formula for the rotation function on an arbitrary edge of a rough molecule.

For several billiard tables, the monotonicity of rotation functions is studied and edge orbital invariants are calculated. For the flat billiard inside an ellipse, it was found a close connection between the action variables and Graves' theorem (about a string and an ellipse).

At the talk we will also discuss an analogue of rotation functions for systems with non-compact leaves.