Hamiltonian Structures and Generating Families

Sergio Benenti

Preface.

The book of the Italian geometer S. Benenti, based on the series of lectures for the students in both mathematics and physics, is a magnificent addition to the books of Arnold, Givental "Symplectic geometry", of Dubrovin, Novikov, Fomenko "Modern Geometry", and of the survey of Vinogradov, Kupershmitd "Structure of Hamiltonian mechanics", which were published in Russian.

However, unlike Russian ones, in this book the main accent is shifted to the application of modern mathematical methods of symplectic geometry and topology in geometrical optics, thermostatics and control theory, and not to the Hamiltonian mechanics only.

The text is specially adapted for a one-semester course of graduate and postgraduate students. To make the book fairly self-contained, full details of basic definitions and all proofs are included. In this way, the majority of the text can be read without the prerequisite of a course in geometry. The excellent collection of examples illustrates the relatively hard and highly abstract mathematical theory and its hidden difficulties.

Moreover, the book can rise real interest for specialists, as the presentation follows the best classical traditions of Italian geometric school (Levi-Civita, etc) and differs from the style of Russian mathematics.

The S. Benenti book is a significant input in the modern symplectic geometry and its applications, whereas rich collections of scientific matter can become a source of new ideas for the experts working in this sphere or in allied ones.

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