

PREFACE

These Conference Proceedings contain most of the contributions and lecture courses presented at the 13th International Conference on Geometry, Integrability and Quantization. The Conference took place in the gorgeous geographical frame of the Saints Constantine and Elena resort, on the Black Sea coast, from June 3-8, 2011.

The Conference was organized in a unique session providing the setting for vivid discussions and interactions between participants and lecturers. The interdisciplinary character of the Conference attracted a variety of interesting and modern topics.

Namely, the mathematical theory of solitary waves and soliton equations was amply represented with talks on viscous fingering interfaces, geometry of the space of initial data in PDE, integrable hierarchies, integrability problems, integrability in $(1 + 1)$ -dimensions, polynomial bundle Lax operators, symmetric spaces, and recursion operators.

There were very original presentations on various formal and applied subjects like three-dimensional rotations group of absolute rigid bodies, combinatorics of stable plane curves, fixed points and stability.

Modern topics in differential geometry with applications in cosmology, relativity and gravitation were delivered: differential geometry of vectors fields, the Dirac equation in curved space-time, Kerr-Schild geometry, hidden symmetries and complete integrability in higher dimensional black holes, Lorentzian manifolds and surfaces, semi-symmetric non-metric connections on warped product manifolds, star products and application to MIC Kepler problem, and Riemannian manifolds of nonpositive curvature.

The Conferences hosted several talks on geometric quantization and quantum field theories, like Liouville integrability in field theory, algebraic methods of many-body systems, topological quantization, Krichever formal group theory, noncommutative quantum mechanics, the Goursat equation, quantization of Kahler manifolds, chiral de Rham complex and sigma-models, relativistic fields, quantization operators and invariants.

In addition to the productive interaction between the participants, and the high-quality of the talks, we have to emphasize the international atmosphere of the conference with participants from Czech Republic, France, Italy, Japan, Poland, Portugal, Romania, South Africa, Turkey, the USA and of course from Bulgaria. The quality of the Conference was highly increased by the inclusion of three Lecture Courses.

The first set of Lectures was devoted to geometric methods in quantum mechanics containing, among other subjects, geometric quantum mechanics in projective