
Publisher’s description: This volume presents modern trends in the area of symmetries and their applications based on contributions to the workshop “Lie theory and Its applications in physics” held near Varna (Bulgaria) in June 2019.

Traditionally, Lie theory is a tool to build mathematical models for physical systems. Recently, the trend is towards geometrization of the mathematical description of physical systems and objects. A geometric approach to a system yields in general some notion of symmetry, which is very helpful in understanding its structure. Geometrization and symmetries are meant in their widest sense, i.e., representation theory, algebraic geometry, number theory, infinite-dimensional Lie algebras and groups, superalgebras and supergroups, groups and quantum groups, noncommutative geometry, symmetries of linear and nonlinear partial differential operators, special functions, and others. Furthermore, the necessary tools from functional analysis are included. This is a large interdisciplinary and interrelated field.

The topics covered in this volume from the workshop represent the most modern trends in the field: representation theory, symmetries in string theories, symmetries in gravity theories, supergravity, conformal field theory, integrable systems, polylogarithms, and supersymmetry. They also include supersymmetric Calogero-type models, quantum groups, deformations, quantum computing and deep learning, entanglement, applications to quantum theory, and exceptional quantum algebra for the standard model of particle physics. This book is suitable for a broad audience of mathematicians, mathematical physicists, and theoretical physicists, including researchers and graduate students interested in Lie theory.

The articles of this volume will not be indexed individually.

For the preceding workshop as part of the 10th symposium on quantum theory and symmetries see [Zbl 1412.81008; Zbl 1403.81002].

MSC:

81-06 Proceedings, conferences, collections, etc. pertaining to quantum theory
81R05 Finite-dimensional groups and algebras motivated by physics and their representations
81R10 Infinite-dimensional groups and algebras motivated by physics, including Virasoro, Kac-Moody, W-algebras and other current algebras and their representations
81R12 Groups and algebras in quantum theory and relations with integrable systems
81R50 Quantum groups and related algebraic methods applied to problems in quantum theory
22E70 Applications of Lie groups to the sciences; explicit representations
17B81 Applications of Lie (super)algebras to physics, etc.
22E45 Representations of Lie and linear algebraic groups over real fields: analytic methods
81T30 String and superstring theories; other extended objects (e.g., branes) in quantum field theory
81T60 Supersymmetric field theories in quantum mechanics
83C45 Quantization of the gravitational field
81P68 Quantum computation
81P40 Quantum coherence, entanglement, quantum correlations
00B25 Proceedings of conferences of miscellaneous specific interest

Full Text: DOI