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Sommario/riassunto

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 in Sofia, Bulgaria (on-line) in June 2021. 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 big interdisciplinary and interrelated field. The topics covered in this Volume are the most modern trends in the field of the Workshop: Representation Theory, Symmetries in String Theories, Symmetries in Gravity Theories, Supergravity, Conformal Field Theory, Integrable Systems, Quantum Computing and Deep Learning, Entanglement, Applications to Quantum Theory, Exceptional quantum algebra for the standard model of particle physics, Gauge Theories and Applications, Structures on Lie Groups and Lie Algebras. This book is suitable for a broad audience of mathematicians, mathematical physicists, and theoretical physicists, including researchers and graduate students interested in Lie Theory.