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Nota di contenuto	Horospheres and Twistors -- Spectrally ordered Lie algebras -- Algebraic expressions for classes of generalized 6-j and 9-j symbols for certain Lie groups -- Harmonic analysis on coset spaces -- The mapping class group: Homology and linearity -- Invariantly ordered spectral lie algebras as abstract dynamical systems -- Realizations of representations of Kac-Moody groups and bilinear equations for ?-functions -- Recent developments in non linear representations and evolution equations -- New constructions for representations of semisimple lie groups -- Nonrelativistic supersymmetry -- Superfield algebraic structures with Grassmann-valued structure constants -- The

non-uniqueness of supertrace -- Cohomological methods in supermanifold theory -- Superalgebras of symmetries in superquantum mechanics -- Supersymmetric quantum mechanics and critical potentials -- Constrained lagrangians in N = 2-superspace formulations for the constant magnetic field system -- On some graded algebras -- Self-consistency and supersymmetry in a many fermion system -- Essentially irreducible representations of the lie superalgebras sl(n/1) and sl(n/2) -- Octonions without octonions -- Soliton solutions and bilinear residue formula for the super Kadomtsev-Petviashvili hierarchy -- Indices for plethysms of representations of Lie superalgebras -- Constructions of Lie (super) algebras from triple systems -- Coherent states and quantization on homogeneous spaces -- Relativistic spectrum generating groups: Spectrum and radiative transitions in a collective model for hadrons -- Heisenberg equations of motion for, the Coulomb problem and so(4.2) -- Degenerate representations from quantum kinematical constraints -- Application of non-bijective transformations to various potentials -- Nonuniqueness of the variational formulation of classical equations of motion and quantization rules -- About Quadratic Transformations Connected To Hurwitz Transformations -- Geometric quantization of Riemann ellipsoids -- Group-theoretic approach to scattering: The Dirac-Coulomb problem and relativistic supersymmetry -- On a quantum mechanical d'Alembert principle -- Geometric quantization of the Kepler problem with a magnetic charge -- Lie algebra of a derivative nonlinear Schrödinger equation -- Symmetry and classification of energy bands in crystals -- Dynamical su(8) for phase-coexistence: Thermodynamics of an so(4) × so(4) submodel -- Chain adaptation of space group representations and induced space group Clebsch-Gordan matrices -- Perturbation of bisemigroups and transport theory -- Space group representations induced by local site symmetries -- Quasicrystals: A distanced overview -- The time inversion symmetry in case of time translation existing -- Ergodic properties of hard rod systems -- Reducible space groups -- Colour space groups of all cubic chromomorphic classes and their application -- Auxiliary group approach for group-subgroup related transformation matrices -- A new approach to non-periodic order in solids -- Group theoretical analysis of the lattice distorsion in anisotropic Superconductivity -- The topological theory of semidefects -- Symmetries in nuclei -- Boson representation of Sp(24, R) and classification of even-even nuclei -- Group Theory of the Symplectic Nuclear Model -- The nuclear collective WSp(6,R) model -- Extension of the interacting boson model: Higher order interactions preserving the dynamical symmetry (The 0(6) limit) -- Classical Yang-Mills fields with non-compact invariance -- Cartan connections in conformal gauge theories -- The anomaly-flux-index identity and its Euclidean extension -- Quantization of anomalous gauge theories: The chiral Schwinger model -- QED as a theory of quantized connection forms -- Group-theoretical aspects of dimensional reduction -- Sp(2)-symmetric realization of the ghost spectrum in gauge theories -- The symmetry group of the Euclidean CPn model as the invariance group of two bilinear formst -- On nets of local algebras on the Minkowski lattice Z4 -- Complex scalar fields in SO(2,1)-Invariant backgrounds: Representation of the symmetries in the schrödinger picture -- Conformally invariant wave equations on 3+2 de sitter space -- Massless particles in de sitter space -- Covariant lagrangian formulation of interacting heterotic strings -- A generalization of the fourier transform and applications to quantum field theory -- Harmonic representatives of instantons and self-dual monopoles --

Homogeneous space construction of Modular Invariant QFT models with a chiral U(1) current -- Some solutions of the U(N) sigma models -- Fermions and Jordan matrices -- Algebraic and arithmetic geometry in string theory.

Sommario/riassunto

The aim of this well-known annual colloquium on group theoretical and geometrical methods in physics is to give an overview of current research. Original contributions along with some review articles cover relevant mathematical developments as well as applications to physical phenomena. The volume contains contributions dealing with concepts from classical group theory, supergroups, superalgebras, infinite dimensional groups, Kac-Moody algebras and related structures. Applications to physics include quantization methods, nuclear physics, crystallography, gauge theory and strings in particle physics. Most of the articles have an introductory or a review section, so the volume will be useful not only for researchers but also for graduate students.