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Nota di contenuto	Intro -- DYNAMICAL SYMMETRY OF THE KEPLER-COULOMB PROBLEM IN CLASSICAL AND QUANTUM MECHANICS: NON-RELATIVISTIC AND RELATIVISTIC -- CONTENTS -- ABOUT THE AUTHORS -- PREFACE -- INTRODUCTION -- THE GENERAL CONCEPTS OF DYNAMICAL SYMMETRIES -- REFERENCES -- HIDDEN (DYNAMICAL) SYMMETRIES IN CLASSICAL MECHANICS -- I.1. CONSTANTS OF MOTION AS GENERATORS OF INFINITESIMAL TRANSFORMATIONS -- Remark -- I.2. DERIVATION OF LRL VECTOR -- I.3. APPLICATIONS OF LRL VECTOR IN CLASSICAL PHYSICS -- (I) LRL Vector and the Orbit Equation -- (II). Algebraic Aspects of the Kepler Problem -- I.4. DYNAMICAL SYMMETRY FOR THE ISOTROPIC HARMONIC OSCILLATOR -- I.5. POSSIBLE GENERALIZATIONS OF DYNAMICAL SYMMETRIES -- Comments -- I.6. APPLICATION OF THE DYNAMICAL EVOLUTION OF LRL VECTOR IN GENERAL CENTRAL CASE [12] -- Equations of Motion for General Central Forces -- Equations of Motion for Arbitrary Forces -- Summary Comments on Dynamical Symmetries in Classical (Non-Relativistic) Mechanics -- REFERENCES -- HIDDEN SYMMETRY IN CLASSICAL RELATIVISTIC MECHANICS -- II.1. AUXILIARY PROBLEM: LRL VECTOR FOR A MODIFIED KEPLER PROBLEM -- II.2. THE LAPLACE-RUNGE-LENZ VECTOR AND THE LORENTZ BOOST -- II.3. POST-NEWTONIAN EXTENSIONS OF THE LRL VECTOR -- II.4. RELATIVISTIC KEPLER PROBLEM -- REFERENCES -- DYNAMICAL

SYMMETRIES IN NON-RELATIVISTIC QUANTUM MECHANICS -- III.1. THE HYDROGEN ATOM (GENERAL CONSIDERATION) -- Algebraic Aspects of the Hydrogen Problem [2] -- III.2. THE HYDROGEN ATOM IN THE MOMENTUM -- Representation -- Example of Application of The Momentum Representation: Dynamical Symmetry of a Three Dimensional Wick-Cutkosky Problem [7] -- III. 3. THE HYDROGEN ATOM AND THE LORENTZ GROUP -- III. 4. THREE DIMENSIONAL ISOTROPIC HARMONIC OSCILLATOR AND $SU(3)$ [14] -- REFERENCES -- A NEW KIND OF DYNAMICAL SYMMETRY -SUPERSYMMETRY -- IV.1 SUPERSYMMETRIC QUANTUM MECHANICS. IV.2. SUPERSYMMETRY AND THE RADIAL PROBLEM -- IV. 3. EXACT SUPERSYMMETRY IN THE NON-RELATIVISTIC HYDROGEN ATOM -- REFERENCES -- RELATIVISTIC QUANTUM MECHANICS -- V.1. SUPERSYMMETRY IN THE DIRAC EQUATION FOR THE COULOMB POTENTIAL -- APPENDIX: SHAPE INVARIANCE (SI) -- V. 2. AN "ACCIDENTAL SYMMETRY" OPERATOR FOR THE DIRAC EQUATION IN THE COULOMB POTENTIAL -FROM PAULI TO DIRAC -- V. 3. PHYSICAL MEANING AND SOME APPLICATIONS OF JOHNSON - LIPPMANN OPERATOR -- APPENDIX: CALCULATION OF RELEVANT COMMUTATORS -- REFERENCES -- GENERALIZATIONS TO THE RELATIVISTIC DIRAC HAMILTONIAN -- VI.1. SUPERSYMMETRY OF THE DIRAC HAMILTONIAN FOR GENERAL CENTRAL POTENTIALS -- VI.2. WHERE IS THE HARMONIC OSCILLATOR? -- VI.3. RELATIVISTIC QUANTUM MECHANICS OF DIRAC OSCILLATOR -- VI.4. THE LORENTZ - SCALAR POTENTIAL IN THE DIRAC EQUATION -- VI.5. ALGEBRAIC DERIVATION OF THE SPECTRUM OF THE DIRAC HAMILTONIAN FOR AN ARBITRARY COMBINATION OF THE LORENTZ-SCALAR AND LORENTZ-VECTOR COULOMB POTENTIAL -- Comments -- REFERENCES -- SOME RECENT DEVELOPMENTS -- VII.1 HIDDEN SUPERSYMMETRY OF THE DIRAC-COULOMB PROBLEM AND THE BIEDENHARN APPROACH -- VII.2 SOME PRACTICAL GENERALIZATIONS: THE LRL VECTOR IN THE PRESENCE OF AN ELECTRIC FIELD [9] -- CONCLUSIONS -- REFERENCES -- BIBLIOGRAPHY (PART I) -- PART II -- INDEX.

Sommario/riassunto

The purpose of this book is to develop a systematic theory for the hidden symmetry generators, which are simultaneously the odd generators of superalgebra in relativistic quantum mechanics. It is devoted to the description of so-called hidden symmetry of the Kepler problem in classical and quantum mechanics.