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group; 2. Groups of coordinate transformations; 3. The group of the Schrodinger equation; 4. The role of matrix representations; Chapter 2. The Structure of Groups; 1. Some elementary considerations; 2. Classes; 3. Invariant subgroups; 4. Cosets; 5. Factor groups; 6. Homomorphic and isomorphic mappings; 7. Direct products and semi-direct products of groups; Chapter 3. Lie Groups; 1. Definition of a linear Lie group
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4. The Wigner-Eckart Theorem generalized
5. Representations of direct product groups; 6. Irreducible representations of finite Abelian groups; 7. Induced representations; Chapter 6. Group Theory in Quantum Mechanical Calculations; 1. The solution of the Schrodinger equation; 2. Transition probabilities and selection rules; 3. Time-independent perturbation theory; Chapter 7. Crystallographic Space Groups; 1. The Bravais lattices; 2. The cyclic boundary conditions; 3. Irreducible representations of the group T of pure primitive translations and Bloch's Theorem; 4. Brillouin zones
5. Electronic energy bands
6. Survey of the crystallographic space groups; 7. Irreducible representations of symmorphic space groups; 8. Consequences of the fundamental theorems; Chapter 8. The Role of Lie Algebras; 1. ""Local"" and ""global"" aspects of Lie groups; 2. The matrix exponential function; 3. One-parameter subgroups; 4. Lie algebras; 5. The real Lie algebras that correspond to general linear Lie groups; Chapter 9. The Relationships between Lie Groups and Lie Algebras Explored; 1. Introduction; 2. Subalgebras of Lie algebras; 3. Homomorphic and isomorphic mappings of Lie algebras
4. Representations of Lie algebras
5. The adjoint representations of Lie algebras and linear Lie groups; 6. Direct sum of Lie algebras; Chapter 10. The Three-dimensional Rotation Groups; 1. Some properties reviewed; 2. The class structures of SU(2) and SO(3); 3. Irreducible representations of the Lie algebras su(2) and so(3); 4. Representations of the Lie groups SU(2), SO(3) and O(3); 5. Direct products of irreducible representations and the Clebsch-Gordan coefficients; 6. Applications to atomic physics; Chapter 11. The Structure of Semisimple Lie Algebras; 1. An outline of the presentation
2. The Killing form and Cartan's criterion

Sommario/riassunto

This book, an abridgment of Volumes I and II of the highly respected Group Theory in Physics, presents a carefully constructed introduction to group theory and its applications in physics. The book provides an introduction to and description of the most important basic ideas and the role that they play in physical problems. The clearly written text contains many pertinent examples that illustrate the topics, even for those with no background in group theory. This work presents important mathematical developments to theoretical physicists in a form that is easy to comprehend and appreciate.
