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Nota di contenuto	Frontmatter -- Preface -- Notation -- Contents -- Chapter 0. Introduction -- Part I. Symmetry Groups of Elementary Particles -- Chapter 1. Lorentz Group -- Chapter 2. Groups of Internal Symmetries -- Chapter 3. Problems to Part I -- Part II. Classical Theory of the Free Fields -- Chapter 4. Lagrangian and Hamiltonian Formalisms of the Classical Field Theory -- Chapter 5. Classical Theory of Free Scalar Fields -- Chapter 6. Spinor Field -- Chapter 7. Vector Fields -- Chapter 8. Electromagnetic Field -- Chapter 9. Equations for Fields with Higher Spins -- Chapter 10. Problems to Part II -- Part III. Classical Theory of Interacting Fields -- Chapter 11. Gauge Theory of the Electromagnetic Interaction -- Chapter 12. Classical Theory of Yang-Mills Fields -- Chapter 13. Masses of Particles and Spontaneous Breaking of Symmetry -- Chapter 14. On the Construction of the General Lagrangian of Interacting Fields -- Chapter 15. Solutions of the Equations for Classical Fields: Solitary Waves, Solitons, Instantons -- Chapter 16. Problems to Part III -- Part IV. Second Quantization of Fields -- Chapter 17. Axioms and General Principles of Quantization -- Chapter 18. Quantization of the Free Scalar Field -- Chapter 19. Quantization of the Free Spinor Field -- Chapter 20. Quantization of the Vector and Electromagnetic Fields. Specific Features of the Quantization of Gauge Fields -- Chapter 21. CPT. Spin and Statistics -- Chapter 22.

Representations of Commutation and Anticommutation Relations -- Chapter 23. Green Functions -- Chapter 24. Problems to Part IV -- Part V. Quantum Theory of Interacting Fields. General Problems -- Chapter 25. Construction of Quantum Interacting Fields and Problems of This Construction -- Chapter 26. Scattering Theory. Scattering Matrix -- Chapter 27. Equations for Coefficient Functions of the S-Matrix -- Chapter 28. Green Functions and Scattering Matrix -- Chapter 29. On Renormalization in Perturbation Theory -- Chapter 30. Method of Functional (Path) Integrals in Quantized Field Theory -- Chapter 31. Problems to Part V -- Part VI. Axiomatic and Euclidean Field Theories -- Chapter 32. Wightman Axiomatics -- Chapter 33. Other Axiomatic Approaches -- Chapter 35. Euclidean Axiomatics -- Chapter 36. Problems to Part VI -- Part VII. Quantum Theory of Gauge Fields -- Chapter 37. Quantum Electrodynamics (QED) -- Chapter 38. Quantization of Gauge Fields -- Chapter 39. Standard Models of Interactions -- Chapter 40. Problems to Part VII -- Appendix. Hints for the Solution of Problems -- Bibliography -- Index

Sommario/riassunto

This monograph is devoted to the systematic presentation of foundations of the quantum field theory. Unlike numerous monographs devoted to this topic, a wide range of problems covered in this book are accompanied by their sufficiently clear interpretations and applications. An important significant feature of this monograph is the desire of the author to present mathematical problems of the quantum field theory with regard to new methods of the constructive and Euclidean field theory that appeared in the last thirty years of the 20th century and are based on the rigorous mathematical apparatus of functional analysis, the theory of operators, and the theory of generalized functions. The monograph is useful for students, post-graduate students, and young scientists who desire to understand not only the formality of construction of the quantum field theory but also its essence and connection with the classical mechanics, relativistic classical field theory, quantum mechanics, group theory, and the theory of path integral formalism.
