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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.