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Die Grundlehren der mathematischen Wissenschaften

in Einzeldarstellungen mit besonderer Berücksichtigung der Anwendungsgebiete

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O. M. Nikodým

The Mathematical Apparatus for Quantum-Theories

Based on the Theory of Boolean Lattices

By Professor
Dr. Otton Martin Nikodým

XII, 952 pages 8vo. 1966
Cloth DM 144,—

The announced book gives a precise and detailed presentation of a new mathematical apparatus, based on original studies of the author. The book is divided into several chapters, it starts with short outlines of the general theory of Boolean lattices, and gives a more extensive treatise of related topics, to be applied later. Especially a geometrical theory of lattices, whose elements are closed subspaces of the Hilbert-space, is exhibited with details. Upon applying these topics there is given and founded a canonical representation of normal operators in the Hilbert-space, and its applications to their operational calculus, eigenvalues and spectrum, permutability of normal operators and multiplicity of spectrums which may be even continuous.

The new notions of quasi-vectors and quasi-numbers are introduced and studied. A new kind of interpretation of sets of quasi-vectors on Boolean lattices yields a new, general system of coordinates in Hilbert-space which is as well adapted to the continuous spectrum, as the ordinary orthonormal system of coordinates is to the discontinuous one. The treatment of both kinds of spectrums is uniform. The mentioned interpretation-theory of sets of quasi-vectors is carefully exhibited and applied to a new notion of local average-value of functions, and also to the precise setting of the theory of Dirac's delta-function and to the proof of its basic properties.

The last chapters contain a comprehensive study of square-summable fields of quasi-numbers, which are especially important for problems of quantum-theories, which involve the continuous spectrum.

The book is destined not only for mathematicians, but also for physicists. The proofs are explicit and not only sketched, so a physicist, not sufficiently well trained in modern abstract analysis, could follow the reasonings without difficulty and not spend too much time for completing the proofs.

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