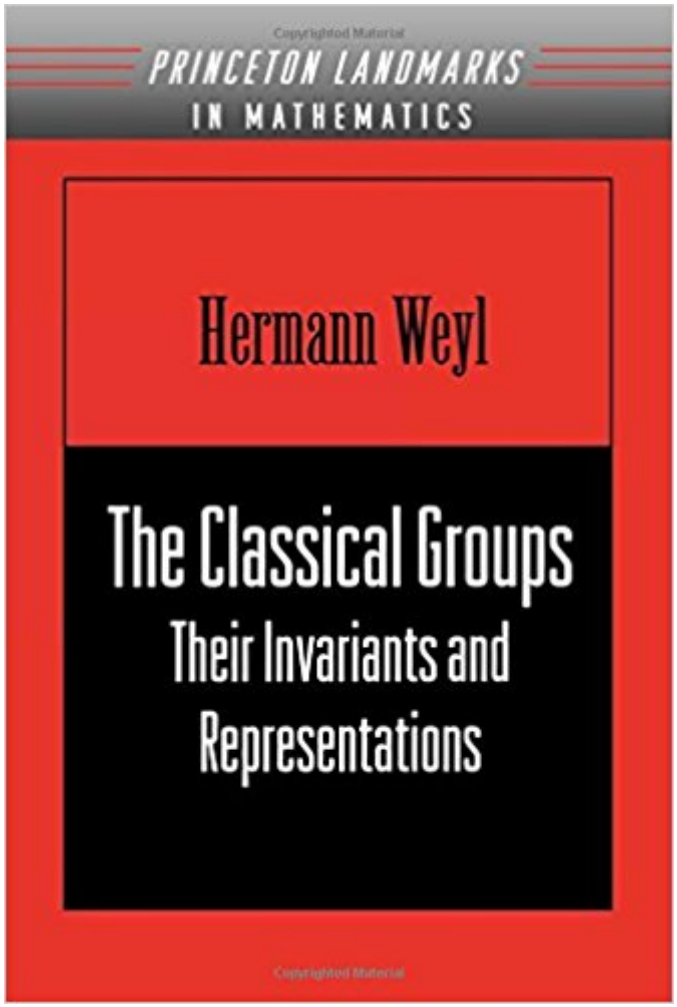
The Classical Groups: Their Invariants And Representations



Synopsis

In this renowned volume, Hermann Weyl discusses the symmetric, full linear, orthogonal, and symplectic groups and determines their different invariants and representations. Using basic concepts from algebra, he examines the various properties of the groups. Analysis and topology are used wherever appropriate. The book also covers topics such as matrix algebras, semigroups, commutators, and spinors, which are of great importance in understanding the group-theoretic structure of quantum mechanics. Hermann Weyl was among the greatest mathematicians of the twentieth century. He made fundamental contributions to most branches of mathematics, but he is best remembered as one of the major developers of group theory, a powerful formal method for analyzing abstract and physical systems in which symmetry is present. In The Classical Groups, his most important book, Weyl provided a detailed introduction to the development of group theory, and he did it in a way that motivated and entertained his readers. Departing from most theoretical mathematics books of the time, he introduced historical events and people as well as theorems and proofs. One learned not only about the theory of invariants but also when and where they were originated, and by whom. He once said of his writing, "My work always tried to unite the truth with the beautiful, but when I had to choose one or the other, I usually chose the beautiful." Weyl believed in the overall unity of mathematics and that it should be integrated into other fields. He had serious interest in modern physics, especially quantum mechanics, a field to which The Classical Groups has proved important, as it has to quantum chemistry and other fields. Among the five books Weyl published with Princeton, Algebraic Theory of Numbers inaugurated the Annals of Mathematics Studies book series, a crucial and enduring foundation of Princeton’s mathematics list and the most distinguished book series in mathematics.

Book Information

Paperback: 336 pages
Publisher: Princeton University Press; 2nd Revised ed. edition (October 13, 1997)
Language: English
ISBN-10: 0691057567
ISBN-13: 978-0691057569
Product Dimensions: 6 x 0.8 x 9 inches
Shipping Weight: 1.3 pounds (View shipping rates and policies)
Average Customer Review: 3.9 out of 5 stars 3 customer reviews
Best Sellers Rank: #621,002 in Books (See Top 100 in Books) #79 inÃ Â Books > Science & Math

> Mathematics > Pure Mathematics > Group Theory #363 inÃ Â Books > Science & Math > Mathematics > Applied > Differential Equations #7179 inÃ Â Books > Textbooks > Science & Mathematics > Mathematics

Customer Reviews

Forget about that pansy abstract axiom approach. This is the WWF of group theory. Weyl will take anyone to the mat with this book. It is packed with detail and demonstrations. He follows the vector space/matrix representation approach common to digital systems, physics and chemistry rather than axiomatic, generators/permutations approach more common in Abstract Algebra courses. This is the lineage that develops matrix transforms as groups starting from "the full group of all non-singular linear transformations and .. the orthogonal groups" (p. vii). The latter chapters cover characters and invariants. Galois and field theory have been vanquished. Chapter 2, "Remembrance of things past" is very entertaining. My favorite quote, "Here there is only one man to mention - Hilbert. His papers (1890/92) mark a turning point in the history of invariants theory. He solves the main problems and thus almost kills the whole subject." It’s funny because it’s true. This is almost a botanical treatise in which the matrix groups are studied as specimens in the jungle -- "...after all each group stands in its own right and does not deserve to be looked upon merely as a subgroup of...Her All-embracing Majesty GL(n)." (p 136). Historic references throughout provide motivation and entertainment. You couldn’t possibly be disappointed with this book.

Although this is a dated work, lacking some of the more modern language, it is still worth owning and reading. It is, after all, a designated "classic." And the material presented has been incorporated within so many aspects of physics that one simply cannot avoid needing a book such as this. There are better books on the subject, for both mathematicians and physicists, but this book still proves its worth.

His presentation of simplectic groups (although short) was helpful.That said having had Weyl’sÃ Â Space, Time, MatterÃ Â for many yearsI’m used to his notation, but here he is very intense in his presentationand somewhat less than clear. As he is the founder of gauge group theoryone expects some mathematics, just not where it seems more difficult than necessary?Also the, now, standard classifications of Cartan groups aren’t mentioned (although might bebecause of the original publishing date of 1939?).I got this book looking for the Weyl root groups used in making Cartan invariant matriceswhich I couldn’t find.So on these points the book is a disappointment while

still being a classic text.

The Classical Groups: Their Invariants and Representations (Princeton Landmarks in Mathematics and Physics) The Classical Groups: Their Invariants and Representations Groups and Symmetries: From Finite Groups to Lie Groups (Universitext) Lie Groups, Lie Algebras, and Representations: An Elementary Introduction (Graduate Texts in Mathematics) Quantum Theory, Groups and Representations: An Introduction Representations and Characters of Groups, Second Edition The Mathematical Theory of Symmetry in Solids: Representation Theory for Point Groups and Space Groups (Oxford Classic Texts in the Physical Sciences) Leading Life-Changing Small Groups (Groups that Grow) Transformational Groups: Creating a New Scorecard for Groups Patai's 1992 Guide to the Chemistry of Functional Groups (Patai's Chemistry of Functional Groups) The Chemistry of Double-Bonded Functional Groups, Supplement A3, 2 Part Set (Patai's Chemistry of Functional Groups) Stochastic Models, Information Theory, and Lie Groups, Volume 1: Classical Results and Geometric Methods (Applied and Numerical Harmonic Analysis) Introduction to Non-Abelian Class Field Theory, An: Automorphic Forms of Weight 1 and 2-Dimensional Galois Representations (Series on Number Theory and Its Applications) Alien Bodies: Representations of Modernity, 'Race' and Nation in Early Modern Dance Energy Accounts: Architectural Representations of Energy, Climate, and the Future Asian America through the Lens: History, Representations, and Identities (Critical Perspectives on Asian Pacific Americans) Representations of Slavery: Race and Ideology in Southern Plantation Museums Foundations of Measurement Volume I: Additive and Polynomial Representations (Dover Books on Mathematics) Women and the Machine: Representations from the Spinning Wheel to the Electronic Age D-Modules and Spherical Representations. (MN-39) (Princeton Legacy Library)