

A Course in Modern Mathematical Physics: Groups, Hilbert Space and Differential Geometry

By Peter Szekeres



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This book, first published in 2004, provides an introduction to the major mathematical structures used in physics today. It covers the concepts and techniques needed for topics such as group theory, Lie algebras, topology, Hilbert space and differential geometry. Important theories of physics such as classical and quantum mechanics, thermodynamics, and special and general relativity are also developed in detail, and presented in the appropriate mathematical language. The book is suitable for advanced undergraduate and beginning graduate students in mathematical and theoretical physics, as well as applied mathematics. It includes numerous exercises and worked examples, to test the reader's understanding of the various concepts, as well as extending the themes covered in the main text. The only prerequisites are elementary calculus and linear algebra. No prior knowledge of group theory, abstract vector spaces or topology is required.

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Review

'This is a beautifully crafted book. ... Peter Szekeres presents in the most elegant and compelling manner a magnificent overview of how classic areas such as algebra, topology, vector spaces and differential geometry form a consistent and unified language that has enabled us to develop a description of the physical world reaching a truly profound level of comprehension. ... Szekeres's style is clear, thorough and immensely readable. His selection of topics concentrates on areas where a fully developed rigorous mathematical exposition is possible. ... One cannot help but be slightly awed by the beauty and the capability with which seemingly abstract concepts, often developed in the realms of pure mathematics, turn out to be applicable ... I recommend that you get hold of this book for yourself or for your library.' The Times Higher Education Supplement

'The superb layout and an index contribute to the excellent overall impression of this book ...'. Zentralblatt MATH

'... the book may serve as an easily accessible introductory text on a wide range of the standard and more basic topics in mathematics and mathematical physics for the beginner, with an emphasis on differential geometry. a nice feature is that a considerable number of examples and exercises is provided, together with numerous suggestions for further reading: there is also an extensive index which will be particularly helpful for beginners in the subject.' General Relativity and Gravitation Journal

About the Author

Peter Szekeres received his PhD from King's College London in 1964, in the area of general relativity. He subsequently held research and teaching positions at Cornell University, King's College and the University of Adelaide, where he stayed from 1971 till his recent retirement. Currently he is a Visiting Research Fellow at that institution. He is well known internationally for his research in general relativity and cosmology, and has a good reputation for his teaching and lecturing.

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