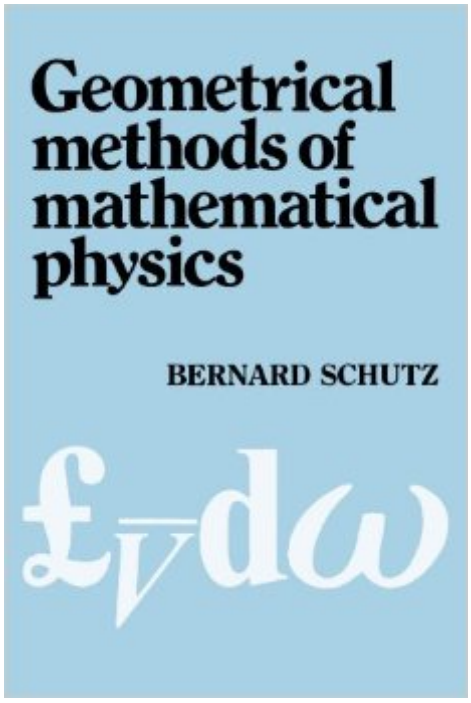
Geometrical Methods Of Mathematical Physics



Synopsis

In recent years the methods of modern differential geometry have become of considerable importance in theoretical physics and have found application in relativity and cosmology, high-energy physics and field theory, thermodynamics, fluid dynamics and mechanics. This textbook provides an introduction to these methods - in particular Lie derivatives, Lie groups and differential forms - and covers their extensive applications to theoretical physics. The reader is assumed to have some familiarity with advanced calculus, linear algebra and a little elementary operator theory. The advanced physics undergraduate should therefore find the presentation quite accessible. This account will prove valuable for those with backgrounds in physics and applied mathematics who desire an introduction to the subject. Having studied the book, the reader will be able to comprehend research papers that use this mathematics and follow more advanced pure-mathematical expositions.

Book Information

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Customer Reviews

The exposition in this book is concise, intuitive and, for the most part, quite lucid. It’s really tops for getting the larger view, relating key mathematical concepts to applications in physics. As an autodidact, I’ve found it particularly productive to use this book in conjunction with a more detailed treatment of some particular topic, e.g. tensors, representation theory for groups and the relationship between that and Lie groups and algebras. I’ve also found it enlightening to supplement this book with the typically more detailed and superb expositions on some topic in Frankel’s The

Geometry of Physics: An Introduction, Second Edition and in Wasserman's apparently lesser known but phenomenal Tensors and Manifolds: With Applications to Physics. With some foundation/supplementation, the book can profitably be used to solidify and extend one's intuitive understanding of these mathematical topics and come to understand how they are of use in physics. One can also use the book to identify weakness in one's understanding and to determine what else one needs to study to make further progress. In addition, Schutz provides solutions or hints to the exercises. It's a comparatively quick read and overall, quite enjoyable. Highly recommended for self-study but see the caveats below.Despite my high praise, I think that this book is best used as a supplement to more thorough treatments of the math covered (mainly, differential manifolds, forms, Lie derivatives, Lie groups).