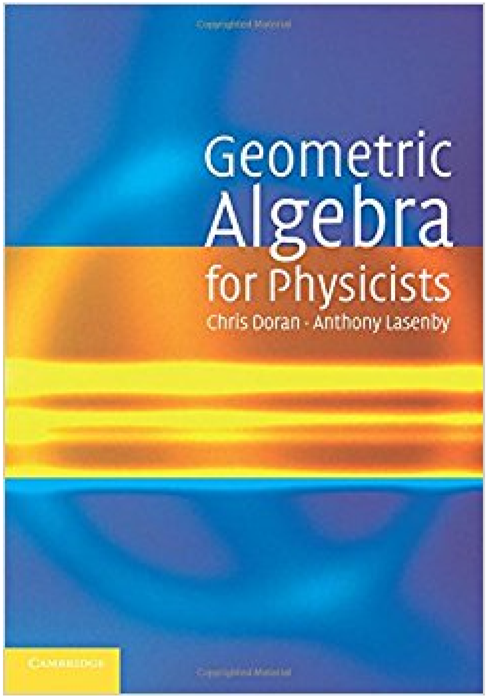
Geometric Algebra For Physicists



Synopsis

This book is a complete guide to the current state of geometric algebra with early chapters providing a self-contained introduction. Topics range from new techniques for handling rotations in arbitrary dimensions, the links between rotations, bivectors, the structure of the Lie groups, non-Euclidean geometry, quantum entanglement, and gauge theories. Applications such as black holes and cosmic strings are also explored.

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Customer Reviews

Review of the hardback: 'I would therefore highly recommend this book for anyone wishing to enter this interesting and potentially fundamental area.' Mathematics Today'The range of topics presented in the book is astonishing. ... The present book is intended for physicists, but mathematicians will also find it highly valuable. The exposition of Grassmann's algebra given at the beginning of the book is exceptionally clear and is written with a light touch. ... It is extraordinarily well written and is a beautifully produced piece.' The Mathematical Gazette

Geometric Algebra has advanced rapidly in the last ten years, becoming an important topic in the physics and engineering communities. As leading experts in the field the authors have led many of these new developments. This book provides an introduction to the subject covering applications such as black hole physics and quantum computing. Suitable as a textbook for graduate courses on the physical applications of geometric algebra, this book is also a valuable reference for all researchers working in the fields of relativity and quantum theory.

I've only read Chapter 1 so far - been on the road with other responsibilities. But Doran is the one who wrote a PhD thesis on how to re-formulate a wide variety of physics in Geometric Algebra; he's taught at Cambridge in the 25 years since, and just gotten better at explaining things clearly. His co-authors teach beside him, and have gotten better as well.

Highly recommend. Will one day be considered a classic

The main author has given up on theoretical physics and now runs a software development company specializing in lighting/shading routines for video games. His new work is amazing, and I wish him all the best.I'm hoping that one day Chris Doran's software company releases a killer GA package for Mathematica/Maple, similar to Digiarea's Atlas2 for differential forms.

Provides a very interesting point of view, absolutely necessary for grasping the bolts and plumbing of modern physics.The material covered was not present in other texts that I had a look at so this book serves as a good corner stone to build advanced undergraduate and graduate courses on.

vey clear

I love this book as a reference for the application of geometric algebra or Clifford algebras to problems of mathematical physics. It's scope is mind boggling and perhaps that's one of it's problems. Nevertheless this book is a great addition to your library and I'm glad clifford analysis and quaternions are finally getting their due.However the book is not for the novice scientist. Some of the exposition is very terse and the conclusions are not always obvious. Moreover a lot of the proofs are simply omitted. For this reason I recommend reading a more thorough math primer on the topic prior to fully engaging this. I wish I could recommend such a text that isn't overly pedantic or doesn't assume PhD level work in either math or physics.I made some progress with Holomorphic Functions in a plane and N-dimensional space http://www..com/Holomorphic-Functions-Plane-n-dimensional-Space/dp/3764382716/ref=sr_1_1?s=books&ie=UTF8&qid=1450383926&sr=1-1,although this focuses on Cl(0,n) and not Cl(1,3), which is the main Clifford algebra used these days by physicists along with it's sibling Cl(3,0).One of the topics this volume does omit is the computational physics side of things. In particular there is no mention of Feuter polynomials or useful worked examples for solutions of the Dirac equation that covers a lot of physics problems, particularly electromagnetics. A lot of those problems were worked out in the past for biquaternions based on analytic function theory for real quaternions. This will use a Dirac operator that differs a bit from the one presumed here, though the theories dovetail if you burrow into the details.The book only hints at the strong connection between standard complex analytic function theory and the theory of 4D analytic functions. Again you have to go to outside references to find this. Moreover there is a conformal mapping theory that is emerging that would presumably help for all kinds of boundary value problems in this area.I do also have one final complaint not related to the books content. The font that is used in the book is not very readable being quite cramped. Furthermore the kindle version is atrocious, though perhaps better than some other math oriented textbooks. The fact that they render the math fonts as blurry bit maps, not always centered in the text is extremely aggravating. Why you wouldn't use a decent typesetter like Latex for the math fonts is bizarre, but that is just one pet peeve. Since my kindle doesn't handle pdf very well either this remains a problem for math oriented text.

This book has a good introduction to geometric algebra. This includes an excellent axiomatic presentation, unlike the Hestenes New Foundations book where the basic identities are presented rather randomly.The title of this book "for Physicists", is very accurate. This book assumes a great deal of physics knowledge and many subjects are not covered in enough detail for comprehensibility for first time study. With an engineering education, much of the physics in this book is over my head. Many important details are treated very much more briefly than I would personally like. This is justifiable unfortunately since the book would otherwise be three thousand pages long.In order to understand the parts of this book that I have now covered, I have had to also go off on the side and learn aspects of relativity, tensors, electromagnetism, Lagrangians, Noether's theorem, and much more (QM and more relativity and more E&M are next on my list before returning to this book).Studying this text continues to be a fun project, and if I ever finish this book I believe I will have a fairly good understanding of basic physics. Despite being a very hard book to grasp due to brevity and advanced topics, taking the time to work through the details provides valuable insights, and yields approaches that would not be obvious with only traditional formulations.

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