Group Theory In A Nutshell For Physicists

Synopsis

Although group theory is a mathematical subject, it is indispensable to many areas of modern theoretical physics, from atomic physics to condensed matter physics, particle physics to string theory. In particular, it is essential for an understanding of the fundamental forces. Yet until now, what has been missing is a modern, accessible, and self-contained textbook on the subject written especially for physicists.Group Theory in a Nutshell for Physicists fills this gap, providing a user-friendly and classroom-tested text that focuses on those aspects of group theory physicists most need to know. From the basic intuitive notion of a group, A. Zee takes readers all the way up to how theories based on gauge groups could unify three of the four fundamental forces. He also includes a concise review of the linear algebra needed for group theory, making the book ideal for self-study.Provides physicists with a modern and accessible introduction to group theoryCovers applications to various areas of physics, including field theory, particle physics, relativity, and much moreTopics include finite group and character tables; real, pseudoreal, and complex representations; Weyl, Dirac, and Majorana equations; the expanding universe and group theory; grand unification; and much moreThe essential textbook for students and an invaluable resource for researchersFeatures a brief, self-contained treatment of linear algebraAn online illustration package is available to professorsSolutions manual (available only to professors)

Book Information

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Customer Reviews

Honorable Mention for the 2017 PROSE Award in Textbook/Best in Physical Sciences and

Mathematics, Association of American Publishers"Another excellent entry in the â ˆNutshell' series, Zee's latest has it all: broad scope, depth, thorough explanations, history, and an appealing sense of humor. The author's knowledge of mathematics and physics is encyclopedic, and he leavens the text generously with episodes and asides drawn from the life and work of the major figures in the development of group theory and its applications in physics."--Choice"In Group Theory in a Nutshell for Physicists, Anthony Zee . . . combines clarity of presentation with mathematical detail at a level of rigor acceptable to physicists. The result is a tour de force that guides readers through the universe of group theory and leads them to recent particle physics, cosmology, and condensed matter. The book is unique in its laid-back presentation."--Physics Today"This book lives up to my high expectations and can stand shoulder to shoulder with Zeeâ ™s other two Nutshell books."--Johannes Koelman, Science 2.0

"Zee's lovely book on the theory of group representations is comprehensive and complete, both from the mathematical and physical points of view. While it doesn't discuss the representations of the symmetric groups, the book's got almost everything on the mathematical side, including roots and weights in the theory of compact Lie groups. The physics applications are mainly from high energy physics but also include some from chemical and condensed matter physics. Clearly written, this book makes an ideal text for a graduate course in physics on the subject."--Barry Simon, California Institute of Technology"This excellent book stands out by its clarity of presentation."--Eugene Demler, Harvard University"This is an ambitious book. Zee brings together a lot of material not easily found in one place."--Savdeep S. Sethi, University of Chicago"Group Theory in a Nutshell for Physicists fills a gap in the market. Zee turns group theory into a less intimidating topic."--Katrin Becker, Texas A&M University

Anthony Zee writes wonderful deep books for physicists and this is no exception. Warning for mathematicians: I am a group theorist and this is not how we think of teaching group theory. But that aside, Professor Zee knows his audience and in addition to the group theory thered is a wealth of physics applications.

I'm a undergraduate studying physics, and I was struggling finding any reference about group theory, especially for physics, and this book came into my mind. In overall, the book has great explanation, good for group theory starters. This book was very helpful.

I own about eight books with titles like group theory in physics, and I took a vow not to buy any others. But when A. Zee writes a physics book (especially in the Nutshell series), I feel compelled to buy it, as he is such a fantastic teacher, and expositor of theoretical physics. I received the book today, and having thumbed through the book it looks like an excellent place for an undergraduate to start his group theory studies. About the only topic that I think is missing is Young tableaux, but these are covered in some of my other books. There seems to be an infinite amount to learn on symmetries and groups in physics, and Zee's book seems like the best beginning book.Having now finished the book, I would like to add some comments. First there are lots of errors, but they are the easy kind to spot - sort of keeps the student on his toes. My favorite concerns the doozy on P.470 on the product of two Feynman slash variables (Wouldn't it be nice if the error were true), but of course where the author uses it, in the following sentence on equating the variables, ends up being correct. Second I wish there were more exercises, particularly in the latter third of the book there are often 1,2, or no exercises per section. Of course as Zee admonishes, he expects you to be actively working out the material in the text even before you read it. But still problems/calculations are essential for both cementing material and applying/extending to new material. And I wish Zee had included more.In terms of content, the book excels at explaining and using the concept of real, pseudo real, and complex representations. No other group theory book (some don't even mention the topic) treats this as well as Zee does. Additionally his treatment of Clifford algebras and spinors is masterful. So if you see QFT, GUTS, Supersymmetry, and or Strings in your future, this book is the easiest place to get some necessary background knowledge, and be entertained as well.

Thank you "Dear Professor"!!One can simply not find a better author from which to learn physics! Zee stokes the flames of passion for physics. Reading his books i feel invigorated and confident. One positive aspect, i find, is that in some sections he proceeds "painfully slow" so as not to confuse the reader and he "beats to death" the rotation group SO(N)This is a book (all books really) you absolutely HAVE to work through examples and problems as you go through the text.You cannot expect to learn group and representation theory simply by reading. Practice. And our "dear professor" reiterates this idea throughout the formal part of the book. (So far i am 140pages in)our Dear Professor offers many many examples of finite groups (which i personally feel is more tricky than continuous groups) and helps you construct character tables and deduce the irreps with his guidance.So far (since ive only gone through some of the formalisms of group theory) i have not felt as though i am "falling in love" with group theory (as is a pervasive theme in his other two nutshell books - READ AMD WORK THROUGH THEM!) But as a physicist i already have a working

knowledge of group theory and appreociate the power of the subjectI suspect as the book delves into physics and the use of groups in physics readers will certainly fall in love woth the subject. (I will update my review as i work through the book)One interesting idea behind our Dear Professor's books is that they are VERY conversational. I'm simply venturing to guess that millenials (such as myself) prefer these types of expositions over more formal and sterile expositions. In this way i see our Dear Professor paving the way towards a more ubiquitious trend in textbooks.I was extremely stoked for many months when i learned our Dear Professor was writing this book and i am even more stoked to find out what he will offer next!Keep on keeping on Dear Professor!!!!

I like Zee's books and I like this book. However, I don't think it's a good place to start learning about group theory. In my humble opinion, he covers too many advanced topics, which arenÃ¢Â Â™t essential for beginners. Especially many beginners may feel the need to understand all these advanced topics before reading on and thus give up before they read about the most important topics, such as spinors. However, after reading a quicker introduction to the essentials, like RobinsonÃ¢Â Â™s Ã¢Â ÂœSymmetry and the Standard Model: Mathematics and Particle PhysicsÃ¢Â Â• or SchwichtenbergÃ¢Â Â™s Ã¢Â ÂœPhysics from Symmetry (Undergraduate Lecture Notes in Physics)Ã¢Â Â•, itÃ¢Â Â™s great to read ZeeÃ¢Â Â™s special perspective and his enjoyable explanations of advanced topics.