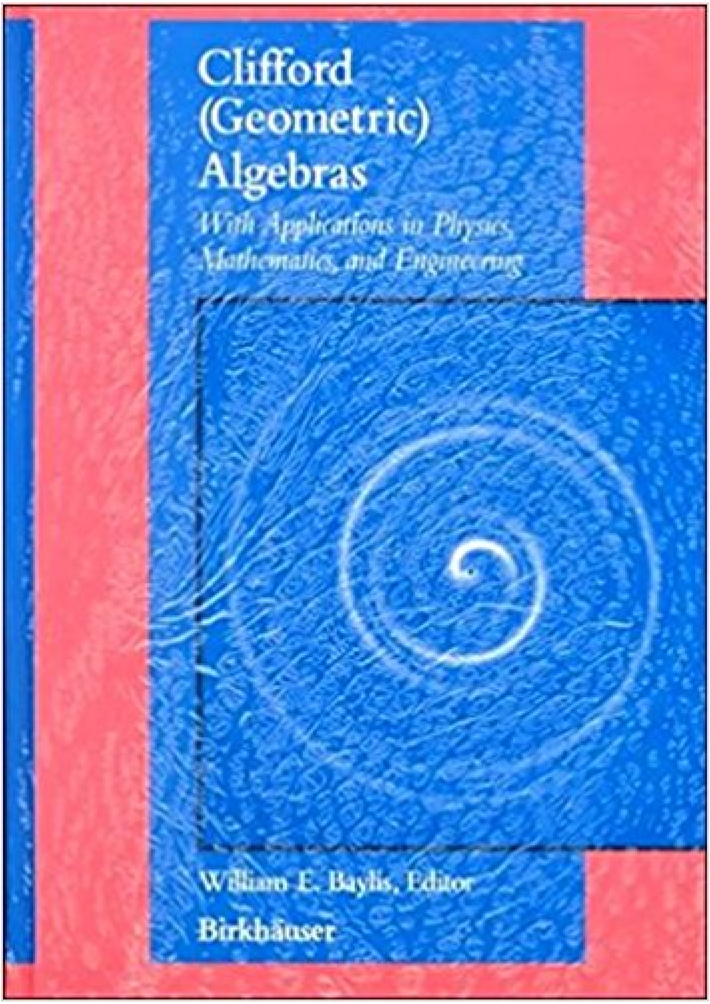
The book was found

Clifford (Geometric) Algebras With Applications In Physics, Mathematics, And Engineering



Synopsis

This volume is an outgrowth of the 1995 Summer School on Theoretical Physics of the Canadian Association of Physicists (CAP), held in Banff, Alberta, in the Canadian Rockies, from July 30 to August 12,1995. The chapters, based on lectures given at the School, are designed to be tutorial in nature, and many include exercises to assist the learning process. Most lecturers gave three or four fifty-minute lectures aimed at relative novices in the field. More emphasis is therefore placed on pedagogy and establishing comprehension than on erudition and superior scholarship. Of course, new and exciting results are presented in applications of Clifford algebras, but in a coherent and user-friendly way to the nonspecialist. The subject area of the volume is Clifford algebra and its applications. Through the geometric language of the Clifford-algebra approach, many concepts in physics are clarified, united, and extended in new and sometimes surprising directions. In particular, the approach eliminates the formal gaps that traditionally separate clasÂ- sical, quantum, and relativistic physics. It thereby makes the study of physics more efficient and the research more penetrating, and it suggests resolutions to a major physics problem of the twentieth century, namely how to unite quantum theory and gravity. The term "geometric algebra" was used by Clifford himself, and David Hestenes has suggested its use in order to emphasize its wide applicability, and b& cause the developments by Clifford were themselves based heavily on previous work by Grassmann, Hamilton, Rodrigues, Gauss, and others.

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Customer Reviews

This book, a compilation of 33 articles covering many different aspects and applications of Clifford algebras, can be read profitably by anyone desiring an overview of their history, theory, and applications. I did not read every article, and space also prohibits such a comprehensive review, so I will comment only on the ones that I actually studied.Chapter introduces Clifford algebras as an extension of the real numbers to include vectors and vector products. The familiar representation in Euclidean space is outlined, with emphasis on the exterior product of two vectors, which, the author points out, is associative (unlike the ordinary cross product). The connection with rotations, reflections, and volume elements is pointed out, and the complex numbers and the Pauli algebra are shown to be Clifford algebras.A short history of Clifford algebras is given in chapter 2. The reader not familiar with Clifford algebras should have no trouble following the ensuing discussion where some elementary geometric constructions are given of the Clifford algebra on the Euclidean plane. In addition, the operator approach to Weyl, Majorana, and Dirac operators is given, illustrating in detail their connection to physics. Recognizing that the Fierz identities do not by themselves give the Weyl and Majorana spinors, the author introduces what he calls the boomerang method for their construction. The boomerang is essentially a linear combination of bilinear covariants for a spinor, and the author details the conditions under which the spinor can be reconstructed. Interestingly, and unknown to me at the time of reading this chapter, the author constructs a new class of spinors, the "flag-dipole" spinors, that are different from the Weyl, Majorana, and Dirac spinors.

Measurement [per ASME Y14.5-2009] Geometries, Groups and Algebras in the Nineteenth Century - A History Lie Groups, Lie Algebras, and Representations: An Elementary Introduction K-Theory for Operator Algebras (Mathematical Sciences Research Institute Publications) Introduction to Nonassociative Algebras. Curvature in Mathematics and Physics (Dover Books on Mathematics)