book reviews

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An Introduction to Clifford Algebras and Spinors.
By Jayme Vaz Jr and Roldão da Rocha Jr. Oxford University Press, 2016. Pp. 256. Price GBP 55.00 (hardback). ISBN 9780198782926.

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The Clifford algebra associated with a vector space endowed with a scalar product is an algebra of square matrices over real numbers, complex numbers or quaternions, or the sum of two such algebras. A spin group can be viewed as a group living in the Clifford algebra. Spin groups are double coverings of the special orthogonal groups. Spinors are elements of the space of irreducible representations of the Clifford algebras. The main idea behind these notions is that of square roots.

Spinors are basic concepts in many domains: physics, quantum-field theory, mathematics, computer science, engineering and so on. There are also many types of spinors, including Weyl, Pauli, Majorana and pure spinors.

This book aims to provide a systematic elementary and complete introduction to Clifford algebras and spinors for a wide audience of students and researchers in different fields. The pre-requisite is a course in linear algebra. It starts with a nice, concise and useful presentation of the historical background of Clifford algebras and their relations to exterior and Grassmann algebras. The classification of Clifford algebras is then given together with the definition of the associated Pin and Spin groups. In the last chapter a systematic introduction to the world of spinors is given. Three categories of spinors are defined: algebraic, classical and operatorial.

The authors' approach is very clear and elementary despite the formal and rather heavy algebraic aspects involved. The numerous concrete examples given to illustrate each new notion are valuable for a better understanding of the subject and are helpful for potential applications in different fields. For example, the triality principle in dimension 8, which has many applications in physics and in mathematics, is studied in detail.

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