

Rafał Abłamowicz and Garret Sobczyk

## Lectures on Clifford (Geometric) Algebras and Applications

The subject of Clifford (geometric) algebras offers a unified algebraic framework for the direct expression of the geometric concepts underlying the mathematical theories of linear and multilinear algebra, projective and affine geometries, and differential geometry. This bird's eye view of Clifford (geometric) algebras and their applications is presented by six of the worlds leading experts in the field.

### Key Topics and Features:

- An introductory chapter on Clifford algebras by Pertti Lounesto
- Ian Porteous (Chapter 2) reveals the mathematical structure of Clifford algebras in terms of the classical groups
- John Ryan (Chapter 3) introduces the basic concepts of Clifford analysis, which extends the well-known complex analysis of the plane to three and higher dimensions
- William Baylis (Chapter 4) investigates some of the extensive applications that have been made in mathematical physics, including the basic ideas of electromagnetism and special relativity
- John Selig (Chapter 5) explores the successes that Clifford algebras, especially quaternions and bi-quaternions, have found in computer vision and robotics
- Tom Branson (Chapter 6) discusses some of the deepest results that Clifford algebras have made possible in our understanding of differential geometry.
- Editors (Appendix) give an extensive review of various software packages for computations with Clifford algebras including standalone programs, on-line calculators, special purpose numeric software, and symbolic add-ons to computer algebra systems

This text will serve beginning graduate students and researchers in diverse areas — mathematics, physics, computer science and engineering; it will be useful both for newcomers who have little prior knowledge of the subject and established professionals who wish to keep abreast of the latest applications.

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