

**Penrose, Roger; Rindler, Wolfgang**

**Spinors and space-time. Volume 1: Two-spinor calculus and relativistic fields.** (English)

Zbl 0538.53024

Cambridge Monographs on Mathematical Physics. Cambridge etc.: Cambridge University Press. X, 458 p. £45.00; £84.50 (1984).

This book has long been eagerly awaited by workers and students of general relativity. In the early 1960's the reviewer studied, and later lectured, from a preliminary draft of some chapters of it. Although various drafts have been circulated, the final version - in spite of the inordinate delay of twenty years - is well worth waiting for. It is more mathematical and polished than the earlier versions, and there is no doubt that it will instantly become the definitive account of the subject. It is very clearly and carefully written, and will be of interest not only to the experienced researcher, but much of it will be accessible to beginning graduate students. It consists of five chapters: the geometry of world-vectors and spin-vectors; abstract indices and spinor algebra; spinors and world tensors; differentiation and curvature; fields in space-time; and an appendix on diagrammatic notation. Each of these chapters contains not only the obvious material, but many topics and observations which were neither to known only to cognoscenti. It is a goldmine of information on the mathematical apparatus of general relativity. Although it is clearly intended as preliminary to the second volume on twistor theory, it will be invaluable to a reader who is only interested in spinors. Much of the book has the informal and leisurely style of a working seminar - as opposed to that of a formal treatise - and it would be eminently suitable for selfstudy. Nevertheless, one minor criticism seems in order: some of the formalism and notation (particularly that in Chapter 2) seems somewhat excessive. It may all be necessary for the subsequent applications, but one wonders. Indeed one can readily imagine the late Professor J. A. Schouten gazing down in admiration at equations involving four, or more, different kinds of indices! However, the authors are to be warmly congratulated for producing such an excellent book. One is very glad to have Volume 1, and fervently hopes that Volume 2: "Spinor and Twistor Methods in Space-Time Geometry" will appear in the very near future.

Reviewer: [J.Zund](#)

**MSC:**

[53C27](#) Spin and Spin<sup>c</sup> geometry

[53-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to differential geometry

[53B50](#) Applications of local differential geometry to the sciences

[83C99](#) General relativity

Cited in **11** Reviews

Cited in **323** Documents

**Keywords:**

[world-vectors](#); [spin-vectors](#); [spinors](#); [world tensors](#); [curvature](#); [space- time](#); [twistor theory](#)