<<旋量与时空（第1卷）>>

图书基本信息

书名：<<旋量与时空（第1卷）>>

13位ISBN编号：9787506291743

10位ISBN编号：7506291746

出版时间：2009-1

出版时间：彭罗斯 (R.Penrose&w.rindler) 世界图书出版公司 (2009-01出版)

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页数：457

前言

To a very high degree of accuracy， the space—time we inhabit can be taken to be a smooth four-dimensional manifold． endowed with the smooth Lorentzian metric of Einstein ’S special or general relativity． The formalismmost commonly used for the mathematical treatment of manifolds and their metrics iS。
ofcourse， the tensor calculus(or such essentially equivalent alternatives as Cartan ’S calculus of moving frames)
． But in the specific case of four dimensions and Lorentzian metric there happens to exist——by accident or providence—another formalism which iS in many ways more appropriate， and that is the formalism of 2-spinors
． Yet 2-spinor calculus is still comparatively unfamiliar even now—some seventy years after Cartan first introduced the general spinor concept， and over fifty years since Dirac， in his equation for the electron。
revealed a fundamentally mportant role for spinors in relativistic physics and van der Waerdenprovided the basic 2
． spinor algebra and notation． The present work was written in the hope of giving greater currency to these ideas
． We develop the 2-spinor calculus in considerable detail． assuming no prior knowledge of the Subjeer， and show how it may be viewed either as a useful supplement or as a practical alternative to the more familiar world-tensor calculus． We shail concentrate， here， entirely on 2-spinors。
rather than the 4-spinors that have become the more familiar tools of theoretical physicists． The reason for this iS that only with 2． spmors does one 0btain a practical alternative to the standard vectortensor calculus． 2 spinors being the more primitive elements out of which 4 · spinors(as weil as world · tensorsl can be readily built． Spinor calculus may be regarded as applying at a deeper level of structure of space-time than that described by the standard world． tensorcalculus． By comparison， world-tensors are Iess refined． fail to make trans． parent some of the subtler properties of space——time brousht particularly to light by quantum mechanics and， not Ieast， make certain types of mathematical calculations inordinately heavy． f Their strength Iies in a generaI applicability to manifolds of arbitrary dimension． rather than in supplying a specific space—time calculus．)

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内容概要

《旋量与时空(第1卷)》 is the first to present a comprehensive development of space-time geometry using the 2-spinor formalism. There are also several other new features in our presentation. One of these is the systematic and consistent use of the abstract index approach to tensor and spinor calculus. We hope that the purist differential geometer who casually leafs through the book will not automatically be put off by the appearance of numerous indices. Except for the occasional bold-face upright ones, our indices differ from the more usual ones in being abstract markers without reference to any basis or coordinate system. Our use of abstract indices leads to a number of simplifications over conventional treatments.

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书籍目录

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插图：

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