

<<分析流形和物理学>>

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### 前言

All too often in physics familiarity is a substitute for understanding, and the beginner who lacks familiarity wonders which is at fault: physics or himself. Physical mathematics provides well defined concepts and techniques for the study of physical systems. It is more than mathematical techniques used in the solution of problems which have already been formulated; it helps in the very formulation of the laws of physical systems and brings a better understanding of physics. Thus physical mathematics includes mathematics which gives promise of being useful in our analysis of physical phenomena. Attempts to use mathematics for this purpose may fail because the mathematical tool is too crude; physics may then indicate along which lines it should be sharpened. In fact, the analysis of physical systems has spurred many a new mathematical development. Considerations of relevance to physics underlie the choice of material included here. Any choice is necessarily arbitrary; we included first the topics which we enjoy most but we soon recognized that instant gratification is a short range criterion. We then included material which can be appreciated only after a great deal of intellectual asceticism but which maybe farther reaching. Finally, this book gathers the starting points of some great currents of contemporary mathematics. It is intended for an advanced physical mathematics course.

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### 内容概要

we are happy that the success of the first edition gave us a chance to prepare a revised edition. we have made numerous changes and added exercises with their solutions to ease the study of several chapters. the major addition is a chapter "connections on principal fibre bundles" which includes sections on holonomy, characteristic classes, invariant curvature integrals and problems on the geometry of gauge fields, mono poles, instantons, spin structure and spin connections. other additions include a section on the second fundamental form, a section on almost complex and kiihlerian manifolds, and a problem on the method of stationary phase. more than 150 entries have been added to the index. can this book, now polished by usage, serve as a text for an advanced physical mathematics course? this question raises another question: what is the function of a text book for graduate studies? in our times of rapidly expanding knowledge, a teacher looks for a book which will provide a broader base for future developments than can be covered in one or two semesters of lectures and a student hopes that his purchase will serve him for many years. a reference book which can be used as a text is an answer to their needs. this is what this book is intended to be, and thanks to a publishing company which keeps it moderately priced, this is what we hope it will be.

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