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<<Torsions of 3-dimens>>

图书基本信息

书名：<<Torsions of 3-dimensional manifolds3-dimensional多头管扭力>>

13位ISBN编号：9783764369118

10位ISBN编号：3764369116

出版时间：2002-1

出版时间：Springer

作者：V. Turaev

页数：196

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内容概要

The book is concerned with one of the most interesting and important topological invariants of 3-dimensional manifolds based on an original idea of Kurt Reidemeister (1935). This invariant, called the maximal abelian torsion, was introduced by the author in 1976. The purpose of the book is to give a systematic exposition of the theory of maximal abelian torsions of 3-manifolds. Apart from publication in scientific journals, many results are recent and appear here for the first time. Topological properties of the torsion are the main focus. This includes a detailed description of relations between the torsion and the Alexander-Fox invariants of the fundamental group. The torsion is shown to be related to the cohomology ring of the manifold and to the linking form. The reader will also find a definition of the torsion norm on the 2-homology of a 3-manifold, and a comparison with the classical Thurston norm. A surgery formula for the torsion is provided which allows to compute it explicitly from a surgery presentation of the manifold. As a special case, this gives a surgery formula for the Alexander polynomial of 3-manifolds. Treated in detail are a number of relevant notions including homology orientations, Euler structures, and Spinc structures on 3-manifolds. Relations between the torsion and the Seiberg-Witten invariants in dimension 3 are briefly discussed. Students and researchers with basic background in algebraic topology and low-dimensional topology will benefit from this monograph. Previous knowledge of the theory of torsions is not required. Numerous exercises and historical remarks as well as a collection of open problems complete the exposition.

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