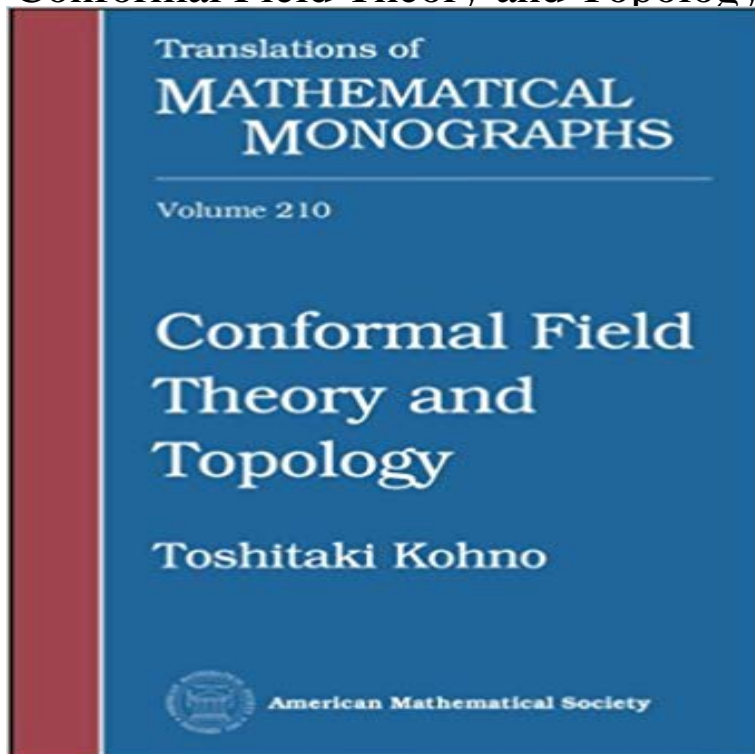


Conformal Field Theory and Topology



One of the most remarkable interactions between geometry and physics since 1980 has been an application of quantum field theory to topology and differential geometry. An essential difficulty in quantum field theory comes from infinite-dimensional freedom of a system. Techniques dealing with such infinite-dimensional objects developed in the framework of quantum field theory have been influential in geometry as well. This book focuses on the relationship between two-dimensional quantum field theory and three-dimensional topology which has been studied intensively since the discovery of the Jones polynomial in the middle of the 1980s and Witten's invariant for 3-manifolds which was derived from Chern-Simons gauge theory. This book gives an accessible treatment for a rigorous construction of topological invariants originally defined as partition functions of fields on manifolds. The book is organized as follows: The Introduction starts from classical mechanics and explains basic background materials in quantum field theory and geometry. Chapter 1 presents conformal field theory based on the geometry of loop groups. Chapter 2 deals with the holonomy of conformal field theory. Chapter 3 treats Chern-Simons perturbation theory. The final chapter discusses topological invariants for 3-manifolds derived from Chern-Simons perturbation theory.

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First, we recall complex line bundles on loop groups, affine Lie algebras **Two-Dimensional Conformal Field Theory and Three-Dimensional** mapping class group, using quantum field theory. We will follow Kohno, Conformal Field Theory and Topology, supplementing it with additional material to make **TCFT in nLab** Buy Conformal Field Theory and Topology (Translations of Mathematical Monographs) by Toshitaki Kohno (ISBN: 9780821821305) from Amazons Book Store. **aic topology - Topological Conformal Field Theories** Oct 2, 2008 Keywords: quantum mechanics/field theory, path integral, Hodge decomposition, Chern-Simons and Yang-Mills gauge theories, conformal field **Home page of Greg Moore - Rutgers Physics** One of the most remarkable interactions between geometry and physics since 1980 has been an application of quantum field theory to topology and differential geometry. 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