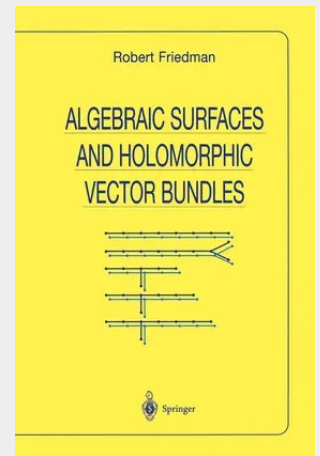


Algebraic Surfaces and Holomorphic Vector Bundles

This book is based on courses given at Columbia University on vector bundles (1988) and on the theory of algebraic surfaces (1992), as well as lectures in the Park City IAS Mathematics Institute on 4-manifolds and Donaldson invariants. The goal of these lectures was to acquaint researchers in 4-manifold topology with the classification of algebraic surfaces and with methods for describing moduli spaces of holomorphic bundles on algebraic surfaces with a view toward computing Donaldson invariants. Since that time, the focus of 4-manifold topology has shifted dramatically, at first because topological methods have largely superseded algebro-geometric methods in computing Donaldson invariants, and more importantly because of Seiberg and Witten, which have greatly simplified the new invariants defined by Seiberg and Witten. The theory and led to proofs of the basic conjectures concerning the 4-manifold topology of algebraic surfaces. However, the study of algebraic surfaces and the moduli spaces of bundles on them remains a fundamental problem in algebraic geometry, and I hope that this book will make this subject more accessible. Moreover, the recent applications of Seiberg-Witten theory to symplectic 4-manifolds suggest that there is room for yet another treatment of the classification of algebraic surfaces. In particular, despite the number of excellent books concerning algebraic surfaces, I hope that the half of this book devoted to them will serve as an introduction to the subject.

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