

# Rigidity and Quasi-Rigidity of External Cycles in Hermitian Systems



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This book investigates the geometry of complex subvarieties of compact Hermitian symmetric spaces, particularly the complex Grassmannians, which are central to Schubert calculus and its applications to enumerative algebraic geometry. To do so, Robert Bryant employs a combination of Hermitian differential geometry, calibrations, and classical moving frame constructions. The main result is that, for Hermitian symmetric spaces  $M$  of rank greater than 1, there are homology classes  $c$  (called extremal) such that the complex varieties  $V$  in  $M$  that represent  $c$  display rigidity in unexpected ways. There are other cycles that display a weaker form of this sort of rigidity, but whose moduli space of representing cycles can still be described in terms of the geometry of subvarieties of related complex projective spaces. These results have applications to other problems in algebraic geometry. For example, for a holomorphic bundle  $E$  over a compact complex manifold  $M$  that is generated by its sections, the Schur polynomials in its Chern classes are known to be non-negative. The above results allow one to give a complete description of such bundles in several cases where one of these Schur polynomials actually vanishes. The book, which will interest researchers and graduate students in complex algebraic geometry or differential

geometry, contains a thorough exposition of the geometry of Hermitian symmetric spaces and their Schubert cycles and characteristic classes as well as other preparatory material needed to obtain the results.

作者介绍:

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