THE UNIVERSITY  OF HONG KONG

Institute of Mathematical Research

Department of Mathematics

Seminar

Characteristic Classes — An Introduction

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Abstract

The Euler characteristic is a topological invariant. In the case of compact smooth manifolds this intrinsic invariant can be calculated for example by applying a smooth vector field on it and counting its zeros. This calculation can be generalized by using more than one smooth vector fields. In this way, people found topological invariants of vector bundles in the form of cohomology classes in the singular cohomology. They are the Stiefel-Whitney classes.

Chern classes are characteristic classes on complex vector bundles. They are related to Euler characteristic when the vector bundle is the tangent bundle, and curvature can be related to Euler characteristic by the Gauss-Bonnet formula. It is natural that there is a way to describe Chern classes in terms of the curvature of a vector bundle in general. The classes are represented by cohomology classes in de Rham cohomology. It is also valuable to see how Chern classes arise from the Cech cohomology and the relation to the definition from de Rham cohomology.

Date: February 12, 2004 (Thursday)

Time: 4:00 – 5:30pm

Place: Room 517, Meng Wah Complex

All are welcome