Non-commutative Chern characters for compact Lie group C*-algebras and compact quantum groups

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(Tea 3:30 pm Math Lounge)

Abstract

Non-commutative differential geometry appeared as a quantization of classical differential geometry. In particular, various cyclic cohomology (or homology) theories are non-commutative versions of the classical de Rham cohomology of differential forms (or currents). Quantum groups were introduced as deformations of a certain classical Hopf algebra that can be viewed heuristically as the algebra of functions on the group (more precisely, as a deformation of the Hopf bialgebra envelope of Lie groups, and later as special cases of quasi-triangular Drinfeld algebras or monoidal categories). The theory is a subject of intensive current research.

Many results have been obtained for quantum groups as analogues of the corresponding classical results for Lie groups. For compact Lie groups, the associated K-groups, de Rham cohomology groups, and the Chern character maps between them have been studied, but such results had not yet been realized in the setting of quantum groups.

In this talk, we explain the genesis of the classical Chern character, we define non-commutative Chern characters from the K-theory of a certain C*-algebra naturally associated to a compact Lie group (respectively, to a quantum group) to an appropriate non-commutative analogue of the de Rham cohomology of the C*-algebra, and we show that the Chern character is an isomorphism (respectively, an isomorphism modulo torsion).

This talk should be accessible to graduate students.   987618842