



*Institute of Mathematical Research
Department of Mathematics*

GEOMETRY SEMINAR

Classification of quantum groups and Belavin – Drinfeld cohomologies

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Abstract

In this talk we discuss the classification of quantum groups whose quasi-classical limit is a given simple complex Lie algebra \mathfrak{g} . This problem reduces to the classification of all Lie bialgebra structures on $\mathfrak{g}(\mathbb{K})$, where $\mathbb{K} = \mathbb{C}((\hbar))$. The associated classical double is of the form $\mathfrak{g}(\mathbb{K}) \otimes_{\mathbb{K}} A$, where A is one of the following: $\mathbb{K}[\varepsilon]$, where $\varepsilon^2 = 0$, $\mathbb{K} \oplus \mathbb{K}$ or $\mathbb{K}[j]$, where $j^2 = \hbar$. The first case relates to quasi-Frobenius Lie algebras. In the second and third cases we introduce a theory of Belavin–Drinfeld cohomology associated to any non-skewsymmetric r -matrix from the Belavin–Drinfeld classification. We prove a one-to-one correspondence between gauge equivalence classes of Lie bialgebra structures on $\mathfrak{g}(\mathbb{K})$ and cohomology classes (in case II) and twisted cohomology classes (in case III) associated to any non-skewsymmetric r -matrix.

Date: March 22, 2013 (Friday)

Time: 3:00 – 4:00pm

Place: Room 210, Run Run Shaw Bldg., HKU

All are welcome