

İSTANBUL ANALYSIS SEMINARS

OPERATORS IN NONCOMMUTATIVE ALGEBRAIC GEOMETRY

Anar DOSI

Middle East Technical University
Northern Cyprus Campus

Abstract: The present talk is devoted to the role of differential operators in Kapranov's model of noncommutative algebraic geometry. We introduce noncommutative complete schemes from universal enveloping algebra $\mathcal{U}(\mathfrak{g}_q)$ of the free nilpotent Lie algebra $\mathfrak{g}_q(\mathbf{x})$ of index q generated by the independent variables $\mathbf{x} = (x_1, \dots, x_n)$. The formal spectrum of its Lie-completion can be treated as the affine space \mathbb{A}_q^n . What are noncommutative projective spaces of this model within M. Artin and J. J. Zang formalism of noncommutative projective schemes remains unclear being a serious problem to be discussed. As a technical tool we involve the formally-radical holomorphic functions in elements of a nilpotent Lie algebra. For each (Zariski) open subset $U \subseteq X = \text{Spec}(\mathbb{C}[\mathbf{x}])$ we obtain the precise descriptions of the algebras $\mathcal{O}_q(U)$ of noncommutative sections on U associated with the affine spaces \mathbb{A}_q^n . The obtained result for $q = \infty$ generalizes Kapranov's formula. Provided machinery from noncommutative analysis allows us to introduce the projective NC-spaces \mathbb{P}_q^n for admissible q . Related projective schemes are described in term of the differential operators over twisted sheaves.

Date: February 13, 2015

Time: 15:40

Place: Sabancı University, Karaköy Communication Center
Bankalar Caddesi 2, Karaköy 34420, İstanbul

İstanbul Analysis Seminars is supported by TÜBİTAK.