Noncommutative geometry of homogenized quantum $\mathfrak{sl}(2, \mathbb{C})$

For printing

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Abstract

We examine the relationship between certain noncommutative analogues of projective 3-space, $\mathbb{P}^3$, and the quantized enveloping algebras $U_q(\mathfrak{sl}_2)$. The relationship is mediated by certain noncommutative graded algebras S, one for each $q \in \mathbb{C}^\times$, having a degree-two central element c such that $S[c^{-1}]_0 \cong U_q(\mathfrak{sl}_2)$. The noncommutative analogues of $\mathbb{P}^3$ are the spaces $\mathrm{Proj}_{\mathrm{nc}}(S)$. We show how the points, fat points, lines, and quadrics, in $\mathrm{Proj}_{\mathrm{nc}}(S)$, and their incidence relations, correspond to finite-dimensional irreducible representations of $U_q(\mathfrak{sl}_2)$, Verma modules, annihilators of Verma modules, and homomorphisms between them.

Keywords

noncommutative algebraic geometry, quantum groups, quantum $\mathfrak{sl}_2$

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Noncommutative Geometry and quantum statistical mechanical systems. by. Matthew Terje Aadne. This innerproduct turns L2(X, μ) into a Hilbert space. In the chapters that follow we will be especially interested in the case where the measure space (X, A, μ) is discrete, meaning that the sigma algebra A is the power set and μ is the counting measure. In this case we use the notation l2(X, μ) instead of L2(X, μ). In the discrete case we have a particularly handy basis for l2(X, μ). For each x ∈ X let x : X → C be dened by. 1 if y = x x(y) = 0 otherwise. The collection forms an orthonormal basis for l2(X, μ), meaning that. then if S ∩ S−1 = {e} we may dene a partial order ≤S on G(S), turning it into a partially ordered group, by. “The Noncommutative Algebraic Geometry of Quantum Projective Spaces,” a dis-sertation prepared by Peter D. Goetz in partial fulllment of the requirements for the Doctor of Philosophy degree in the Department of Mathematics. This dissertation has been approved and accepted by AREAS OF SPECIAL INTEREST: Noncommutative Ring Theory Algebraic Geometry. PROFESSIONAL EXPERIENCE: Graduate Teaching Assistant, Department of Mathematics, University of Oregon, Eugene, 1999-2003. In Construction 1 we build an Ore extension of the rst homogenized Weyl algebra A1(k). From this we construct a one parameter family of generic quantum P3’s, denoted by Sα, α ∈ k∗. We refer the reader to III.2 for the denition of Sα. The main result is Theorem III.2.7 The softening of a quantum group is considered, and we introduce q curvatures satisfying q Bianchi identities, a basic ingredient for the construction of q gravity and q gauge theories. An introduction to noncommutative differential geometry on quantum groups. @article{Aschieri1993ANIT, title={AN INTRODUCTION TO NONCOMMUTATIVE DIFFERENTIAL GEOMETRY ON QUANTUM GROUPS}, author={Paolo Aschieri and Leonardo Castellani}, journal={International Journal of Modern Physics A}, year={1993}, volume={08}, pages={1667-1706} }. Paolo Aschieri, Leonardo Castellani. Published 1993. Noncommutative geometry (NCG) is a branch of mathematics concerned with a geometric approach to noncommutative algebras, and with the construction of spaces that are locally presented by noncommutative algebras of functions (possibly in some generalized sense). A noncommutative algebra is an associative algebra in which the multiplication is not commutative, that is, for which. does not always equal. Noncommutative geometry. Quite the same Wikipedia. Just better. Noncommutative geometry (NCG) is a branch of mathematics concerned with a geometric approach to noncommutative algebras, and with the construction of spaces that are locally presented by noncommutative algebras of functions (possibly in some generalized sense). A. L. Rosenberg has created a rather general relative concept of noncommutative quasicompact scheme (over a base category), abstracting the Grothendieck's study of morphisms of schemes and covers in terms of categories of quasicoherent sheaves and flat localization functors.[5] There is also another interesting approach via localization theory, due to Fred Van Oystaeyen, Luc Willaert and Alain Verschoren, where.