

1096-46-1376

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L_p -representations of free quantum groups.

I will report on recent joint work with Zhong-Jin Ruan, where we investigate the structure of L_p -representations of unimodular discrete quantum groups. Roughly speaking, these are unitary representations with the property that there exists an orthonormal basis of the Hilbert space such that the corresponding matrix coefficients of the representation live in the non-commutative L_p -space associated to the Haar weight. For certain examples of free quantum groups, we characterize (for all $p \in [1, \infty]$) the positive definite functions associated to L_p -representations. As an application of this characterization, we show that the Hopf- $*$ -algebra of polynomial functions over a free orthogonal quantum group admits uncountably many pairwise non-isomorphic “exotic” completions as a quantum group C^* -algebra. (Received September 15, 2013)