

Nica-Toeplitz algebras associated with right tensor C^* -precategories over right LCM semigroups

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Abstract

Tensor C^* -categories and all the more right-tensor C^* -categories, also called semitensor C^* -categories, arise naturally in quantum field theory and duality theory of compact (quantum) groups. Recently they played a fundamental role in a number of results with a flavor of geometric group theory. In this talk we show how these structures can be used to develop a theory of C^* -algebras modeled over semigroups.

Nica-Toeplitz algebras are C^* -algebras associated to product systems - a general form of a semigroup action. While theory of semigroup C^* -algebras, developed by Li, is now well-established, C^* -algebras associated to product systems, through the crucial work of Fowler and Fowler-Raeburn, so far were only studied in the case of positive cones in quasi-lattice ordered groups. Our machinery substantially extends this theory in a number of ways and reveals some new phenomena :

- 1) We consider a larger class of semigroups that may contain invertible elements and need not be embeddable into a group.
- 2) We unify the theory of product systems over semigroups and Fell bundles over discrete groups.
- 3) We may study Doplicher-Roberts versions of Nica-Toeplitz algebras.
- 4) When the semigroup is not cancellative the canonical conditional expectation takes values outside the ambient algebra.
- 5) Geometric condition used by Fowler and Raeburn in their uniqueness theorems is in fact a condition that is necessary and sufficient for Doplicher-Roberts version of Nica-Toeplitz algebras.

The talk is based on a joint work with Nadia Larsen.