HOMOLOGY AND COHOMOLOGY OF PARTIAL REPRESENTATIONS OF GROUPS

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Abstract

Partial representations of groups were introduced in the end of the 90's in the context of C^* algebras generated by partial isometries; a few years later these were studied by Exel, Piccione and Dokuchaev in a purely algebraic context. Several lines of investigation sprang from this paper, such as partial projective representations of groups and partial representations of Hopf algebras. In this talk we go back to partial representations of groups and introduce a homology and cohomology for such representations. The starting point is the definition of the partial invariants functor, which is inspired by the subring of invariants of the Galois theory for partial group actions developed by Dokuchaev, Ferrero and Paques. This functor is representable by a "partial trivial module" B and then partial homology and cohomology are defined as derived functors of Hom and Tensor functors. A first important result is that the Hochschild cohomology of any partial smash product A * G is related to the partial cohomology of G (and the Hochschild homology of A) by means of a spectral sequence.

In order to compute the partial group (co)homology of a representation, we have a resolution analogous to the "bar resolution" of usual group (co)homology. For finite-dimensional partial representations there is a stronger result: both homology and cohomology can be computed by usual homology and cohomology of group representations via a result of M. Dokuchaev and N. Zhukavets on the structure of a partial representation.

This talk is based on joint works with Edson Ribeiro Alvares, Maria Julia Redondo, Dessislava Koshloukova and Mihailo Dokuchaev.

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