

Noncommutative scattered locally compact spaces

Piotr Koszmider

piotr.koszmider@impan.pl

The passage from commutative to noncommutative mathematics has stimulated a big part of mathematical research since the mid 20th century which resulted in the unprecedented impact of this programme on the shape of today's mathematics. Quite central in it were the noncommutative geometry and topology but a noncommutative set-theoretic topology is being developed only recently.

In this talk I we will try to explain some of the challenges of the noncommutative set-theoretic topology focusing on the noncommutative analogues of scattered compact or locally compact Hausdorff spaces known as scattered C^* -algebras. These objects have been investigated since the 80ties but in separation from the classical commutative case (ordinals, Ψ -spaces, ladder system spaces, thin-(very) tall spaces etc).

The talk is based on a joint project with Saeed Ghasemi (IM PAN) in which we developed the noncommutative Cantor–Bendixson derivative on the level of the algebra in the analogy to this kind of derivative for superatomic Boolean algebras and we looked at the basic constructions and problems corresponding to the classical programme of “cardinal sequences” for scattered compact spaces (or equivalently superatomic Boolean algebras), in particular such as thin-tall algebras or Ψ -spaces. The results obtained show increased combinatorial difficulties but also contribute to the theory of nonseparable C^* -algebras providing new examples.

The only noncommutative background which will be needed to follow the talk concerns the multiplication of matrices.

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