

ABSTRACT BIVARIANT CUNTZ SEMIGROUPS

Hannes Thiel, University of Münster, Germany

23 November, 15:30-16:30

We study the category Cu of (abstract) Cuntz semigroups. The Cuntz semigroup $\text{Cu}(A)$ of a C^* -algebra A is an object in Cu . This assignment is a continuous functor from C^* -algebras to Cu .

In previous work by Antoine, Perera and the speaker, it was shown that there is a natural notion of tensor product in Cu , which gives Cu the structure of a symmetric monoidal category. In some cases, the Cuntz semigroup of a tensor product of C^* -algebras can be computed as the tensor product of the Cuntz semigroups of the C^* -algebras.

We will show that for any two semigroups S and T in Cu , there is another semigroup $[[S, T]]$ in Cu which plays the role of the morphisms from S to T . We consider $[[S, T]]$ as an *abstract bivariant Cuntz semigroup*. This construction is adjoint to the tensor product in the following sense: For any three abstract Cuntz semigroups S , T and P , there is a natural bijection

$$\text{Hom}_{\text{Cu}}(S \otimes_{\text{Cu}} T, P) \cong \text{Hom}_{\text{Cu}}(S, [[T, P]]).$$

It follows that Cu is a closed monoidal category.

Given C^* -algebras A and B , we propose that $[[\text{Cu}(A), \text{Cu}(B)]]$ should be considered as the target of a possible analogue of the universal coefficient theorem for Cuntz semigroups.

(Joint work with Ramon Antoine and Francesc Perera.)