ADAM DOR-ON, University of Waterloo

C-envelopes of tensor algebras arising from Markov chains*

In this talk we consider the C*-envelope of the tensor algebras associated to subproduct systems arising from stochastic matrices. This builds upon our previous work where we classified these tensor algebras, and computed the Cuntz-Pimsner algebras associated to finite essential stochastic matrices.

For a tensor algebra arising from a product system X, Katsoulis and Kribs have shown that the C*-envelope of the tensor algebra is always the Cuntz-Pimsner algebra $\mathcal{O}(X)$.

When one considers a subproduct system X, which is not necessarily a product system, the situation may change. When X is a "commutative" subproduct system of finite dimensional Hilbert spaces, Davidson, Ramsey and Shalit have shown that the C*-envelope of the tensor algebra of X is the Toeplitz algebra $\mathcal{T}(X)$. Moreover, Kakariadis and Shalit have recently proven that for a subproduct system X of finite dimensional Hilbert spaces associated to two sided subshifts, either $C^*_{env}(\mathcal{T}_+(X)) = \mathcal{O}(X)$ or $C^*_{env}(\mathcal{T}_+(X)) = \mathcal{T}(X)$ depending on a combinatorial condition on the subshifts.

In contrast to the plausible dichotomy suggested above, for a $d \times d$ irreducible stochastic matrix P we show that the tensor algebra $\mathcal{T}_+(P)$ associated to P yields different C*-envelopes, depending on the columns of the matrix P, which are all "between" the Toeplitz algebra $\mathcal{T}(P)$ and the Cuntz-Pimsner algebra $\mathcal{O}(P)$. We also provide an explicit description of the Shilov ideal of $\mathcal{T}_+(P)$ inside $\mathcal{T}(P)$.

*Joint work with Daniel Markiewicz.