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The Role of the Transpose in Free Probability: the partial transpose of R-cyclic operators

Like tensor independence, free independence gives us rules for doing calculations. With random matrix models, we usually need tensor independence of the entries and some kind of group invariance of the joint distribution of the entries to get the (asymptotic) freeness necessary to apply the tools of free probability.

A few years ago Mihai Popa and I found that the transpose also produces asymptotic freeness, i.e. a matrix could be asymptotically free from its own transpose. Since that we have expanded this work to the case of the partial transposes that arise in quantum information theory.

In this talk I will explain what happens when one transposes certain R-cyclic operators.