COLLOQUIUM

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Mathematics and Statistics

Bipartite entanglement in tensor cones of Toeplitz and Fejer-Riesz operator systems

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Abstract:

In the 1960s, Namioka and Phelps considered the various ways one might define the tensor product of cones, where the cones are assumed to be proper cones in finite-dimensional real vector spaces. The most basic of these possibilities results in what is called the separable cone; the dual of the separable cone constitutes a larger cone, containing the separable cone. Any cone residing between these two is called a tensor cone, and elements of a tensor cone that do not belong to the separable cone are said to be entangled.

In quantum information theory, the proper cones of interest are those generated by density operators, yielding the familiar notion of a separable state. The dual of the cone of separable states is cones of block-positive operators, wherein one finds the entanglement witnesses studied in quantum theory.

At present there is considerable interest in returning to the abstract ideas put forward by Nakioma and Phelps, and the long-standing open problem characterising the context in which the separable cone and its dual coincide has only recently been resolved. In this lecture, I explain some of my own investigations into tensor cones arising from the tensor product of Toeplitz and Fejer-Riesz operator systems.

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