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The absolute positive partial transpose property for random induced states

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As the prospect of building quantum computers becomes concrete, quantum information theory is now one of the most active research areas in science and engineering. Objects of interest in quantum information theory are often convex and of high dimension. Therefore, asymptotic geometric analysis and random matrices are important tools in understanding properties of quantum states, such as, separability and positive partial transpose (PPT). Both separability and PPT (as well as many others) are encoded in the spectral properties of quantum states in a complicated way.

In this talk, I will first introduce the absolute positive partial transpose (APPT) property. APPT allows us to detect positive partial transpose states just based on the information about their eigenvalues. Understanding properties of APPT can be very useful in quantum information theory, as it helps reduce the cost of storage spaces and (processing) time. I will also present our recent results on the generic properties of APPT.

This talk is based on the joint work with B. Collins and I. Nechita (arXiv :1108.1935).

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