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Quantum State Distinguishability, Antidistinguishability, and Exclusion

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A set of pure quantum states is said to be "distinguishable" if upon sampling one at random, there exists a measurement to perfectly determine which state was sampled. It is well-known that a set is distinguishable if and only if its members are mutually orthogonal. In this talk, we explore some variants of distinguishability such as "antidistinguishability", which asks for the existence of a measurement that perfectly determines some state that was *not* sampled, and "state exclusion", which asks for the existence of a measurement that perfectly determines some subset of m states that were not sampled. We show that these problems are captured exactly by a linear algebraic concept called the "factor width" of a matrix, and we use this connection to establish several new bounds on antidistinguishability and state exclusion.

Keyword-1

quantum states

Keyword-2

distinguishability

Keyword-3

antidistinguishability

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