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Absolute k -Incoherence and Antidistinguishability

We explore the quantum resource theory of k -incoherence, in which the free states are those that can be written as a convex combination of pure states with at most k non-zero entries. In particular, we investigate the set of quantum states that can be shown to be k -incoherent based only on their eigenvalues. In analogy with the absolute separability problem, we call these states "absolutely k -incoherent", and we derive several necessary and sufficient conditions for membership in this set. As an application of our results, we derive a correct version of a recently-disproved conjecture about antidistinguishability of quantum states.