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A lower bound of Chernoff type for symmetric quantum hypothesis testing

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One of the problems considered in quantum hypothesis testing is to discriminate between two equiprobable hypotheses, each one represented by a density operator on a fixed finite-dimensional Hilbert space associated with a given quantum system. The decision should be based on results of quantum tests corresponding to POVMs (positve operator valued measures) on n-fold copies of the single quantum system in question. While quantum tests minimizing the Bayesian error probability were constructed by Helstrom and Holevo already about 30 years ago, an expression for the optimal asymptotic quantum error exponent similar to the classical Chernoff bound is still an open problem. We prove a lower bound on the rate exponent and present some special cases where the proposed bound is achievable. We conjecture tightness of the bound in the general case.