Reducing the number of questions in nonlocal games. (English) Zbl 1349.81062

Summary: We show how a vector-valued version of Schechtman’s empirical method can be used to reduce the number of questions in a nonlocal game $G$ while preserving the quotient $\beta^*(G)/\beta(G)$ of the quantum over the classical bias. We apply our method to the Khot-Vishnoi game, with exponentially many questions per player, to produce a family of games indexed in $n$ with polynomially many ($N \approx n^8$) questions and $n$ answers per player so that the ratio of the quantum over the classical bias is $\Omega(n/\log^2 n)$.

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MSC:
81P45 Quantum information, communication, networks (quantum-theoretic aspects)
81P40 Quantum coherence, entanglement, quantum correlations
81P15 Quantum measurement theory, state operations, state preparations
91A05 2-person games

References:


The situation where the players maximize the value of the game is also very interesting, but the optimization of the bias is more suitable in this work.

In Ref. 4 the authors study the ratio of the quantum over the classical value of the game rather than the bias.

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