Quantum Hyperbolic codes and a new Steane-like enlargement

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In [2] Calderbank et al stablish the basis to use classical linear codes (either with the Hermitian or the Euclidean inner product) to construct a class of quantum codes named stabilizer codes. Later their results were generalized for an arbitrary finite field [4, 1]. Most of the quantum codes known so far are obtained via their construction which is called CSS construction.

We use affine variety codes and their subfield-subcodes for obtaining quantum stabilizer codes via the CSS code construction. In particular we are interested in hyperbolic codes because we develop an analogous to the BCH bound for the minimum distance in several variables. With this procedure we get quantum codes with parameters better than the ones available in the literature.

We also present a new generalization of the Steane's enlargement [5] (Hamada [3] for $q \neq 2$) procedure. Applying it to latter family of codes we also produce quantum codes with better parameters than the best known so far.

Referencias

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