

**Abstract**

Abstract. Unitary error bases generalize the Pauli matrices to higher dimensional systems. Two basic constructions of unitary error bases are known: An algebraic construction by Knill, which yields nice error bases, and a combinatorial construction by Werner, which yields shift-and-multiply bases. An open problem posed by Schlingemann and Werner relates these two constructions and asks whether each nice error basis is equivalent to a shift-and-multiply basis. We solve this problem and show that the answer is negative. However, we also show that it is always possible to find a fairly sparse representation of a nice error basis.