

Abstract

We consider the problem of switching off unwanted interactions in a given multipartite Hamiltonian. This is known to be an important primitive in quantum information processing and several schemes have been presented in the literature to achieve this task. A method to construct decoupling schemes for quantum systems of pairwise interacting qubits was introduced by M. Stollsteimer and G. Mahler and is based on orthogonal arrays. Another approach based on triples of Hadamard matrices that are closed under pointwise multiplication was proposed by D. Leung. In this paper, we show that both methods lead to the same class of decoupling schemes. Moreover, we establish a characterization of orthogonal arrays by showing that they are equivalent to decoupling schemes which allow a refinement into equidistant time-slots. Furthermore, we show that decoupling schemes for networks of higher-dimensional quantum systems with t -local Hamiltonians can be constructed from classical error-correcting codes.