

Abstract

Butson Hadamard full propelinear codes

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In this talk we deal with Butson Hadamard matrices, and codes over finite rings coming from these matrices in logarithmic form, called BH-codes. We introduce a new morphism of Butson Hadamard matrices through a generalized Gray map on the matrices in logarithmic form, which is comparable to the morphism given in a recent note of Cathin and Swartz. That is, we show how, if given a Butson Hadamard matrix over the k^{th} roots of unity, we can construct a larger Butson matrix over the l^{th} roots of unity for any l dividing k , provided that any prime p dividing k also divides l . We prove that a \mathbb{Z}_{p^s} -additive code with p a prime number is isomorphic as a group to a BH-code over \mathbb{Z}_{p^s} and the image of this BH-code under the Gray map is a BH-code over \mathbb{Z}_p (binary Hadamard code for $p = 2$). Further, we investigate the inherent propelinear structure of these codes (and their images) when the Butson matrix is cocyclic. Some structural properties of these codes are studied and examples are provided.

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