

Reversible Hadamard Difference Sets in Rank Two 2-Groups

A Hadamard difference set has parameters $(4N^2, 2N^2 - N, N^2 - N)$. It is reversible if $D^{(-1)} = D$. Although the number of reversible difference sets in the groups $\mathbb{Z}_{2^n} \oplus \mathbb{Z}_{2^n}$ appears to grow exponentially with respect to the group size, a search method motivated by rational idempotents significantly reduces the search space. We describe all of these difference sets for $n \leq 6$ ($v \leq 2^{12}$). Based on these examples, we attempt to generalize this process for all values of n .

This is joint work with Martin Malandro.