Meeting: 1001, Evanston, Illinois, SS 5A, Special Session on Codes and Applications

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Parametrization of Self-Dual Binary Codes. Preliminary report.

Let O_m be the group of $m \times m$ orthogonal matrices over $GF(2)$ and $O_m^{(1)}$ the subset of all elements of O_m having each row of weight congruent to 1 mod 4. Then $O_m^{(1)}$ is a subgroup. We apply these groups to the theory of binary self-dual codes showing that O_{2n} is transitive on the set of self-dual codes of length $2n$ and $O_{2n}^{(1)}$ is transitive on the set of doubly-even self-dual codes. Stabilizers are described. These results give new proofs of the known count of the number of (singly and doubly even) self-dual codes.

Let V be the code having generator matrix $[I_n|I_n]$ and $H = O_{2n} \cap St(V)$, $P =$ permutation matrices. Then: inequivalent self-dual codes of length $2n$ is the number of distinct double cosets HUP with $U \in O_{2n}$.

Explicit determination of this number in terms of n remains a major problem in the subject. result: -1 mod 4 is a multiple of 4.

This implies the known result that a doubly-even code exists only if the length is divisible by 8. (Received July 06, 2004)