Abstract

On extremal self-dual $\mathbb{Z}_4$-codes

Matteo Mravić

Department of Mathematics, University of Rijeka

A linear $\mathbb{Z}_4$-code C of length n is a $\mathbb{Z}_4$ sub-module of $\mathbb{Z}_4^n$. With respect to the standard inner product modulo 4, the dual code $C^\perp$ of the $\mathbb{Z}_4$-code C is defined. The code C is self-dual if $C \subseteq C^\perp$. There are two binary codes associated with a $\mathbb{Z}_4$-code C called a residue code and a torsion code. These two codes are a starting point in the construction of self-dual $\mathbb{Z}_4$-codes by the method given in [1]. For $\mathbb{Z}_4$-codes the Euclidean weight of codeword x is defined by $n_1(x) + 4n_2(x) + n_3(x)$, where $n_i(x)$ is the number of components of x which are equal to i. A $\mathbb{Z}_4$-code C of length n is said to be extremal if its minimal Euclidean weight is $8\lfloor \frac{n}{24} \rfloor + 8$. In this talk, we will discuss an algorithm that improves the search for extremal self-dual $\mathbb{Z}_4$-codes which we used to obtain some new extremal codes.

This is joint work with Sanja Rukavina.

References

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[2] S. Ban, D. Crnković, M. Mravić, S. Rukavina, *New extremal Type II $\mathbb{Z}_4$-codes of length 32 obtained from Hadamard matrices*, Discrete Mathematics, Algorithms and Applications, 11, 2019.