Publicacions més rellevants de la línia de recerca:
Codis Z_2Z_4-lineals

Referència: Borges, J. and Fernández, C. and Pujol, J. and Rifà, J. and Villanueva, M. Z_2Z_4-linear codes: generator matrices and duality. *Designs, Codes and Cryptography*, **DOI 10.1007/s10-623-009-9316-9** (2009).

Abstract: A code $\mathcal{C}$ is Z_2Z_4-additive if the set of coordinates can be partitioned into two subsets X and Y such that the punctured code of $\mathcal{C}$ by deleting the coordinates outside X (respectively, Y) is a binary linear code (respectively, a quaternary linear code). In this paper Z_2Z_4-additive codes are studied. Their corresponding binary images, via the Gray map, are Z_2Z_4-linear codes, which seem to be a very distinguished class of binary group codes.

As for binary and quaternary linear codes, for these codes the fundamental parameters are found and standard forms for generator and parity-check matrices are given. In order to do this, the appropriate concept of duality for Z_2Z_4-additive codes is defined and the parameters of their dual codes are computed.

Referència: Pujol, J. and Rifà, J. and Solov'eva, F. Construction of Z_4-Linear Reed-Muller Codes. *IEEE Transactions on Information Theory*, **55 (1)**, (2009), pp. 99–104.

Abstract: New quaternary Plotkin constructions are given and are used to obtain new families of quaternary codes. The parameters of the obtained codes, such as the length, the dimension and the minimum distance are studied. Using these constructions new families of quaternary Reed-Muller codes are built with the peculiarity that after using the Gray map the obtained Z_4-linear codes have the same parameters and fundamental properties as the codes in the usual binary linear Reed-Muller family. To make the duality relationships in the constructed families more evident the concept of Kronecker inner product is introduced.

Referència: Rifà, J. and Solov'eva, F. and Villanueva, M. On the intersection of Z_2Z_4-Additive perfect codes. *IEEE Transactions on Information Theory*, **54 (3)**, (2008), pp. 1346–1357.

Abstract: The intersection structure for Z_2Z_4-additive Hadamard codes is investigated. For any

two of these codes $\mathcal{C}_1$ and $\mathcal{C}_2$, the abelian group structure of the intersection $\mathcal{C}_1 \cap \mathcal{C}_2$ is characterized. The parameters of this abelian group structure corresponding to the intersection codes are computed, establishing lower and upper bounds for them. Constructions are given of codes whose intersection has any parameters between these bounds.

Finally, the intersection problem, i.e. what the possibilities are for the number of codewords in the intersection of two Z_2Z_4-additive Hadamard codes $\mathcal{C}_1$ and $\mathcal{C}_2$ being of the same length, is also studied. Lower and upper bounds for the intersection number are established and, for any value between these bounds, codes with this intersection value are constructed.