

SEMINARIO

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Some Recent Results on LCD Codes

Abstract: Linear complementary dual (LCD) codes are linear codes that intersect with their dual trivially. Several constructions of LCD codes using orthogonal matrices, self-dual codes, combinatorial designs and Gray map from codes over the rings were given in [3], along with a linear programming bound on the largest size of an LCD code of given length and minimum distance. In [4], the class of quasi-cyclic LCD codes was shown to be "good", by using their concatenated structure and a characterization of Hermitian LCD codes. Explicit constructions from codes over larger alphabets were also given. Analogous results are obtained for generalized quasicyclic codes in [5]. More recently, a class of one-generator quasi-twisted codes, namely LCD multinegacirculant codes, are studied [1]. Their concatenated structure yields exact enumeration results for index 2 and index 3, whereas for a general index t and co-index power of 2, a special enumeration is given which is needed for the asymptotic analysis by means of Dickson polynomials. In [2], analogous techniques were used to characterize and enumerate self-dual double negacirculant codes, which also have infinite families with relative distance satisfying a modified Gilbert-Varshamov bound.

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- [2] A. Alahmadi, C. Güneri, B.Ö., H. Shoaib and P. Solé, "On self-dual double negacirculant codes", *Disc. Appl. Math.*, vol. 222, 205-212, 2017.
- [3] S.T. Dougherty, J.-L. Kim, B.Ö., L. Sok and P. Solé, "The combinatorics of LCD codes: Linear programming bound and orthogonal matrices", *Int. J. Inf. and Cod. Theory*, vol. 4, no. 2/3, 116-128, 2017.
- [4] C. Güneri, B.Ö., H. Shoaib and P. Solé, "Quasi-cyclic complementary dual codes", *Finite Fields Appl.*, vol. 42, 67-80, 2016.
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