

Publicacions més rellevants de la línia de recerca: Codis Completament Regulars

Referència: Rifà, J. and Zinoviev, V.A. New completely regular q -ary codes based on Kronecker products. *IEEE Transactions on Information Theory*, **56(1)** (2010), pp. x–x.

Abstract: For any integer $\rho \geq 1$ and for any prime power q , an explicit construction of an infinite family of completely regular (and completely transitive) q -ary codes with $d = 3$ and with covering radius ρ is given. The intersection array is also computed. Under the same conditions, the explicit construction of an infinite family of q -ary uniformly packed codes (in the wide sense) with covering radius ρ , which are not completely regular, is also given. In both constructions the Kronecker product is the basic tool that has been used.

Referència: Rifà, J. and Zinoviev, V.A. On a class of binary linear completely transitive codes with arbitrary covering radius *Discrete Mathematics*, **309 (16)** (2009), pp. 5011–5016.

Abstract: An infinite class of new binary linear completely transitive (and so, completely regular) codes is given. The covering radius of these codes is growing with the length of the code. In particular, for any integer $\rho \geq 2$, there exist two codes in the constructed class with $d = 3$, covering radius ρ and length $\binom{2\rho}{2}$ and $\binom{2\rho+1}{2}$, respectively. The corresponding distance-transitive graphs, which can be defined as coset graphs of these completely transitive codes are described.

Referència: Borges, J. and Rifà, J. and Zinoviev, V.A. On non-antipodal binary completely regular codes.l'article. *Discrete Mathematics*, **308 (16)** (2008), pp. 3508–3525.

Abstract: Binary non-antipodal completely regular codes are characterized. Using a result on nonexistence of nontrivial binary perfect codes, it is concluded that there are no unknown nontrivial non-antipodal completely regular binary codes with minimum distance $d \geq 3$. The only such codes are halves and punctured halves of known binary perfect codes. Thus, new such codes with covering radiuses $\rho = 2, 3, 6$ and $\rho = 7$ are obtained. In particular, a half of the binary Golay $[23, 12, 7]$ -code is a new binary completely regular code with minimum distance $d = 8$ and covering radius $\rho = 7$. The punctured half of the Golay code is a new completely regular code with minimum distance

$d = 7$ and covering radius $\rho = 6$. That new code with $d = 8$ disproves the known conjecture of Neumaier, that the extended binary Golay $[24, 12, 8]$ -code is the only binary completely regular code with $d \geq 8$. Halves of binary perfect codes with Hamming parameters also provide an infinite family of new binary completely regular codes with $d = 4$ and $\rho = 3$. Puncturing of these codes also provide an infinite family of binary completely regular codes with $d = 3$ and $\rho = 2$. Some of these new codes are also new completely transitive codes. Of course, all these new codes are new uniformly packed codes in the wide sense.