

Langevin, Philippe**On the orphans and covering radius of the Reed-Muller codes.** (English) Zbl 0767.94008

Applied algebra, algebraic algorithms and error-correcting codes, Proc. 9th Int. Symp., AAECC-9, New Orleans/LA (USA) 1991, Lect. Notes Comput. Sci. 539, 234-240 (1991).

Summary: [For the entire collection see [Zbl 0758.00016](#).]

R. A. Brualdi, N. Cai and V. S. Pless have given an inductive proof of the existence of families of orphans of $RM(1, m)$ whose weight distributions are $\{2^{m-1} - \varepsilon 2^{(m+k-2)/2} \mid \varepsilon = -1, 0, 1\}$, where k satisfies $0 \leq k < m$ and $k \equiv m \pmod{2}$. We show that any coset of $RM(1, m)$ having this kind of distribution is an orphan. In particular, the coset of a not completely degenerate quadratic form is always an orphan. Working about the conjecture which says that the covering radius of $RM(1, m)$ is even, we prove that an orphan of odd weight of $RM(1, m)$ cannot be 0-covered. Finally, we show that the distance from any cubic of $RM(3, 9)$ to $RM(1, 9)$ is at most 240.

MSC:[94B05](#) Linear codes, generalCited in **3** Documents**Keywords:**

families of orphans; weight distributions; coset; quadratic form; covering radius