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4-*GDD(6^n)s and related optimal quaternary constant-weight codes. (English) Zbl 1258.05010
J. Comb. Des. 20, No. 11-12, 509-526 (2012).

Summary: Constant-weight codes (CWCs) have played an important role in coding theory. To construct CWCs, a K -GDD (where GDD is group divisible design) with the “star” property, denoted by K -*GDD, was introduced, in which any two intersecting blocks intersect in at most two common groups. In this paper, we consider the existence of 4-*GDD(g^n)s. Previously, the necessary conditions for existence were shown to be sufficient for $g = 3$, and also sufficient for $g = 6$ with prime powers $n \equiv 3, 5, 7 \pmod{8}$ and $n \geq 19$. We continue to investigate the existence of 4-*GDD(6^n)s and show that the necessary condition for the existence of a 4-*GDD(6^n), namely, $n \geq 14$, is also sufficient. The known results on the existence of optimal quaternary $(n, 5, 4)$ CWCs are also extended.

MSC:

05B07 Triple systems
94B60 Other types of codes

Cited in 1 Document

Keywords:

4-*GDDs; generalized Steiner systems; constant-weight codes; room squares

Full Text: [DOI](#)

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