

Zbl 499.05014

Erdős, Paul; Larson, J.

On pairwise balanced block designs with the sizes of blocks as uniform as possible. (In English)

Ann. Discrete Math. **15**, 129-134 (1982).

A pairwise balanced design on a finite set S of n elements is a collection, \mathcal{L} , of subsets of S with the property that every 2-subset of S is contained in a unique member of \mathcal{L} . If every member of \mathcal{L} is of the same cardinality, $m + 1$ say, then we have either a trivial situation, $m = 1$ or $m = n - 1$, or we have a finite projective plane of order m . The authors seek to find pairwise balanced designs with $|\mathcal{L}|$ approximately \sqrt{n} for every $L \in \mathcal{L}$. They show, both constructively and probabilistically, how to insure that $|L| = \sqrt{n} + O(n^{\frac{1}{2}-c})$ for every L in \mathcal{L} , where c is a fixed constant, n arbitrary. Their proof utilizes the notion of an arc in a finite projective plane. The authors appear to be unaware of the work on arcs done by the Italian school and others.

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Classification:

05B05 Block designs (combinatorics)

05B25 Finite geometries (combinatorics)

Keywords:

arcs in projective planes; pairwise balanced designs; finite projective plane