

Abstract

**Group theoretic methods in the construction of large sets of  $t$ -designs**

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We survey group theoretic techniques for constructing large sets of  $t$ -designs as well as resolutions of  $t$ -designs. In particular we examine  $t$ -homogeneous,  $G$ -semiregular large sets of  $t$ -designs, the “splicing construction”, orthogonal resolutions, and Room rectangles. Some of these techniques are often used to construct starter structures on which recursive constructions are then based to build new infinite families of previously unknown  $t$ -designs and large sets of  $t$ -designs. We present some open problems that have resisted solution for at least two decades.