4^2-Decomposable Super-simple $(v, 4, 8)$-BIBDs

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Abstract

A design is said to be *super-simple* if the intersection of any two blocks has at most two elements. A design with index λ is said to be $\{\lambda_1^{s_1}, \lambda_2^{s_2}, \ldots, \lambda_r^{s_r}\}$-*decomposable*, with $\sum\limits_{i=1}^{r} s_i \lambda_i = \lambda$, if its blocks can be partitioned into nonempty collections B_{ij}, $1 \leq i \leq r, 1 \leq j \leq s_i$, such that each B_{ij} with the point set forms a design with index $\lambda_i, 1 \leq \lambda_i < \lambda$. In this talk, we will show that there exists a 4^2-decomposable super-simple $(v, 4, 8)$-BIBD (balanced incomplete block design) if and only if $v \equiv 1 \pmod{3}$ and $v \geq 19$.

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