

A generalization of group divisible t -designs

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Cameron, Robert, Andrea et al. defined the concepts of generalized t -design (packing, covering), which form a common generalization of t -design, resolvable design, orthogonal array, 1-factorizations of complete graph. In this talk, we introduce a new class of combinatorial designs which simultaneously provide a generalization of both generalized t -design and group divisible t -design. In certain cases, we derive necessary conditions and parameters relationship for the existence of generalized group divisible t -design (packing, covering), and then point out close connections with various well-known classes of designs, including mixed orthogonal array, factorizations of the complete multipartite graph, large sets of group divisible design and group divisible design with resolvability. Moreover, we investigate constructions for generalized group divisible t -design (packing, covering) and their existence for $t = 2, 3$ and small block sizes. This talk is based on joint work with Jialu Wang, Sijia Liu, Yue Han, Lijun Ma and Lidong Wang.

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