Constructions of Variance balanced designs using combinatorial techniques

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While variance balance (VB) is a statistical property of the block designs, if the block designs are proper, i.e. all blocks are of same size, then the concept of variance balance can be translated into a combinatorial property of the design namely pairwise balance. That is proper variance balanced designs are pairwise designs. We exploit this fact in constructing the VB designs and apply several combinatorial techniques in the constructions. Since replication number is allowed to vary, the designs are non binary. The combinatorial entities those we use in construction are difference set families with half blocks and quarter blocks, mandatory representations designs, balanced incomplete block designs and maximum packings.

Keywords: Blcok deisgns, pairwise balance, maximum packings, different set families, half block.