EFFICIENCY OF CONNECTED BINARY BLOCK DESIGNS WHEN A SINGLE OBSERVATION IS UNAVAILABLE

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Abstract. In this paper the problem of finding the design efficiency is considered when a single observation is unavailable in a connected binary block design. The explicit expression of efficiency is found for the resulting design when the original design is a balanced incomplete block design or a group divisible, singular or semiregular or regular with $\lambda_1 = 0$, design. The efficiency does not depend on the position of the unavailable observation. For a regular group divisible design with $\lambda_1 > 0$, the efficiency depends on the position of the unavailable observation. The bounds, both lower and upper, on the efficiency are given in this situation. The efficiencies of designs resulting from a balanced incomplete block design and a group divisible design are in fact high when a single observation is unavailable.

Key words and phrases: Balanced incomplete block design, connectedness, efficiency, group divisible design, robustness.