Minimum Contamination and Beta-Aberration Criteria for Screening Quantitative Factors

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Abstract

For quantitative factors, the minimum beta-aberration criterion is commonly used for examining the geometric isomorphism and searching for optimal designs. We investigate the connection between the minimum beta-aberration criterion and the minimum contamination criterion. Results reveal that ranking designs by the two criteria can be extremely inconsistent and hence the optimal designs selected by them are likely to be different. We provide statistical justifications showing that the minimum contamination criterion well controls the expected total mean square error of the estimation and demonstrate that it is more powerful than the minimum-aberration criterion on identifying geometrically non-isomophic designs.

KeyWords: Alias matrix, generalized minimum aberration, geometric isomorphism, indicator function, J-characteristics.