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Optimal Design in Linear Paired Comparisons for Thurstonian IRT models

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Oral presentation

Optimal Design in Linear Paired Comparisons for Thurstonian IRT models

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Abstract

In this talk, we present optimal designs for Thurstonian IRT models based on linear paired comparisons. For this paired comparison type, optimal designs of item pairs are characterized by combinations of those values of factor loadings which optimize predetermined criteria, as correlation between estimated and true trait scores. In order to apply these models in the selection of personnel, only positive factor loadings are admitted. This condition requires the development of novel types of optimal designs. Beyond properties of optimal designs developed in the literature so far, two more requirements have to be particularly taken into account: (a) the restriction of the design region, and (b) the constraint that alternatives have to load on mutually distinct factors, respectively. In this talk, we present solutions for the optimal design problem which substantially outperform current methods in the literature in terms of precision and sample size required. These results will carry over to Thurstonian IRT models with binary or ordinal response.

Keywords

Thurstonian IRT model, optimal design

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