Evaluating Grant Applications with Generalized Chain Block Designs in R

Dedicated to the Memory of John Mandel

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Among the contributors to experimental design at the National Bureau of Standards, now the National Institute of Standards and Technology, were W.J. Youden , W.S. Connor, and John Mandel. W.J. Youden introduced chain block designs for physical measurements with high precision. John Mandel enlarged this series to chain block designs with two-way elimination of heterogeneity.

Reviews of grant applications can be organized into arrangements which permit the adjustment of evaluation scores for both the level of individual reviewers and the order of review. The generalized chain block designs permit the evaluation of large number of applications with minimal number of reviewers. This systematic approach to evaluations insures fairness and efficiency within the constraints of limited resources. R enables the analyses of these special incomplete block designs. R packages base, lattice, and ggplot2 may be utilzed to graph the results. Moreover, tables of available designs, (by number of applications, reviewers, and applications per reviewer,) as well as the designs themselves can be computed with R programs. Several real evaluations will be discussed which demonstrate that chain block designs do have application in the social sciences.

References

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