Title: IRT Modeling - Theory and Applications in R

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Abstract:

The workshop provides an introduction to Item Response Theory (IRT) with basic and advanced models for dichotomous and polytomous items. The topics include the Rasch model, linear-logistic test model, and extensions with two, three and four item parameters for dichotomous items. Concerning polytomous items, we discuss the partial credit and rating scale model, generalized partial-credit model and graded response model for items with ordinal response format, and the nominal response model for items with categorical response format. The IRT models are outlined with their formal model equations, theoretical assumptions and implications, estimation techniques, and statistical testing procedures. Applications to simulated and real data sets illustrate the use of IRT models for the analysis of individual differences. Apart from covering classical IRT models for dichotomous and polytomous items, the workshop gives an overview of model extensions and recent developments, like IRT models for the analysis of change, models accounting for testlet effects, IRTree models, and multidimensional polytomous IRT models. The workshop program also includes practical exercises of IRT modeling and analysis with current R packages.

Literature:

Böckenholt, U., & Meiser, T. (2017). Response style analysis with threshold and multi-process IRT models: A review and tutorial. *British Journal of Mathematical and Statistical Psychology, 70*, 159-181.

De Boeck, P., & Wilson, M. (2004). *Explanatory item response models*. New York: Springer.

Chalmers, R. P. (2012). mirt: A multidimensional item response theory package for the R environment. *Journal of Statistical Software, 48(6)*, 1-29.

Embretson, S. E., & Reise, S. P. (2000). *Item response theory for psychologists*. Mahwah, NJ: Lawrence Erlbaum.

Mair, P., & Hatzinger, R. (2007). Extended Rasch modeling: The eRm package for the application of IRT models in R. *Journal of Statistical Software, 20(9)*, 1-20.

Rizopoulos, D. (2006). ltm: An R package for latent variable modeling and item response analysis. *Journal of Statistical Software, 17(5)*, 1-25.