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Computerized Adaptive and Multistage Testing with R

Using Packages *catR* and *mstR*

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The goal of this guide and manual is to provide a practical and brief overview of the theory on computerized adaptive testing (CAT) and multistage testing (MST) and to illustrate the methodologies and applications using R open source language and several data examples. Implementation relies on the R packages *catR* and *mstR* that have been already or are being developed by the first author (with the team) and that include some of the newest research algorithms on the topic. The book covers many topics along with the R-code: the basics of R, theoretical overview of CAT and MST, CAT designs, CAT assembly methodologies, CAT simulations, *catR* package, CAT applications, MST designs, IRT-based MST methodologies, tree-based MST methodologies, *mstR* package, and MST applications. CAT has been used in many large-scale assessments over recent decades, and MST has become very popular in recent years. R open source language also has become one of the most useful tools for applications in almost all fields, including business and education. Though very useful and popular, R is a difficult language to learn, with a steep learning curve. Given the obvious need for but with the complex implementation of CAT and MST, it is very difficult for users to simulate or implement CAT and MST. Until this manual, there has been no book for users to design and use CAT and MST easily and without expense; i.e., by using the free R software.

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