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A STATISTICAL ANALYSIS OF INDEPENDENT TEST ITEMS - A PARAMETRIC APPROACH

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Abstract

Based on the basic concepts in classical test theory (CTT), a parametric method is proposed to develop the computational formulas of difficulty index and discrimination index for independent test items. Unlike the existing non-parametric method in CTT, this new method would take, in addition to the performance of the high and the low groups, that of the middle group into account and may provide results with more information about these two indexes. It shows further that both computational formulas depend only on the odds of correctness in each item. We also provide an efficient computing algorithm by using the probability generating function technique for estimating both index values. A real testing data set is given for empirical study and the results are compared with those obtained by the non-parametric method. Discrepancies between these two methods are also discussed in this study.

Keywords and phrases: classical test theory, difficulty index, discrimination index, independent test items, non-parametric method, parametric method, probability generating function.

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