

Title: Revisiting the Bahadur Representation of Sample Quantiles for the Standard Error of Kernel Equating

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Abstract

In standardized testing, the content of the test forms is unique so that no examinee gains advantage due to item pre-knowledge. If scores from different test administrations are to be compared the difficulty level of the test forms needs to be calibrated. The statistical models of test score equating enables such comparisons through a functional parameter. The standard error of the equating function has been derived using the delta method by using the asymptotic normality of the score probability estimators. An alternative method that uses the Bahadur representation of sample quantiles has also been suggested. This study expands those results to: (i) include general SEE expressions regardless of the choice of kernel function, (ii) include other data collection designs, and (iii) obtain the SEE for the so-called chained equating estimator. Most importantly, the two methods of calculating the SEE are shown to be equivalent for every data collection design. An empirical study comparing two different ways of estimating the SEE is included.

This is a joint work with Jorge Gonzalez, Departemnt of Statistics, Pontificia Universidad Catolica de Chile, Chile