

A Kernel-Smoothed Version of SIBTEST with Applications to Local DIF Inference and Function Estimation

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Abstract

Smoothed SIBTEST, a nonparametric DIF detection procedure, amalgamates SIBTEST and kernel-smoothed item response function estimation. This procedure assesses DIF as a function of the latent trait θ that the test is designed to measure. Smoothed SIBTEST estimates this function with increased efficiency, as compared to SIBTEST, while providing hypothesis tests of local and global DIF. By means of kernel smoothing, smoothed SIBTEST reduces noise in local DIF estimation while retaining SIBTEST's reduction of group-ability-difference-induced DIF estimation bias via use of regression-corrected estimates of ability as design points in the kernel smoothing. By contrast with most nonparametric procedures, matched examinee score cells are not needed, so sparse cell problems are avoided. The performance of smoothed SIBTEST is studied via simulation and real data analysis.