

國立東華大學應用數學系
專題演講

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講題：Online Calibration Via Sequential Estimation with Error in Variables

時間：98年12月18日(星期五) 15:00-17:00

摘要：

Due to the speedy item exhausted rate of the adaptive testing scheme in modern computerized adaptive testing, how to replenish item bank efficiently with new items is crucial to modern test administration and online calibration is therefore an important issue. In calibration problem, the latent trait levels of examinees are treated as design (or explanatory) variables of regression models. When online calibration process is conducted, the latent trait levels of examinees are estimated during an active test and these estimates are subject to estimation errors. Thus, the measurement error method is naturally involved. In this talk, we first discuss some sequential estimation method in generalized linear model when the explanatory variables are measured with errors with focus on the adaptive design case, while the fixed design case can be viewed as a special case. We then discuss its application to the online calibration problems of the item response theory based computerized adaptive testing. For a 3-parameter logistic (PL) regression model, a “two stage” iterative method is proposed to replace the D-optimal design used in a 2-PL model case. The selection of design for estimating the item parameters is discussed. Moreover, because the online calibration procedure is adopted, the selected designs, examinees with estimated latent trait levels, are usually measured with errors. Thus, estimation of item parameters is treated as a sequential estimation problem with measurement errors in design/explanatory variables. The asymptotic properties are obtained, and the sequential procedures are proved to be asymptotically optimal. Some numerical results are presented and some related future studies are briefly discussed.

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