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By

Zhanfeng Wang and Yuan-chin Ivan Chang

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BY ZHANFENG WANG AND YUAN-CHIN IVAN CHANG*

Academia Sinica

Due to development of novel data collection technologies, it is now very common to encounter data in which the number of the explanatory variables collected is large, while the number of variables that actually contributes to the model remains small. Thus, the method that can identify those variables with impact to the model without inferring other noneffective ones will make analysis much more efficient than the traditional methods. In modern regression analysis, many methods are proposed to resolve the model selection problems under such a circumstance, and the asymptotic properties of these methods are mostly discussed as sample size becomes large. However, there still a lacks information of how large the sample size is sufficient to identify those "effective" variables. In this paper, we utilize the idea of sequential sampling method such that the effective variables can be identified efficiently. That is, the sampling is stopped as soon as the "effective" variables are identified and their corresponding regression coefficients are estimated with satisfactory accuracy. Both the fixed and adaptive designs are considered. The asymptotic properties of estimates of the number of effective variables and their regression coefficients are established, and the proposed sequential estimation procedure is shown to be asymptotically optimal. Simulation studies are conducted to illustrate the performance of the proposed estimation method.

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