Generalized Multiparameter Likelihood Models

Lu-Hung Chen
Department of Statistics and Operations Research,
The University of North Carolina at Chapel Hill

Abstract

In parametric modeling, maximum likelihood estimation is in general most powerful, but model misspecification can result in seriously biased estimators. Nonparametric modeling makes no assumptions; however, it would pay a price on the lower rate of convergence since there are more unknowns to be estimated. Even worse, when the dimension of the covariates is large, nonparametric modeling has the "curse of dimensionality" problem. Semiparametric modeling, which is a hybridization of parametric and nonparametric modeling, achieves a good balance between flexibility and stability in model specification.

In this article we develop a semiparametric model which has a wide range of applications. It copes with multiple covariates and adapts to dynamic structural changes well. Our model includes some popular models, such as partially linear model and varying coefficient model, as special cases. The associated estimation problem is solved by a simple and effective two-step method. The proposed estimator of the parametric part has root-n convergence rate, and the estimator of the nonparametric part enjoys an adaptivity property. Data-driven bandwidth selection and model selection procedures are suggested. This is a co-work with Prof. Ming-Yen Cheng and Dr. Wenyang Zhang.