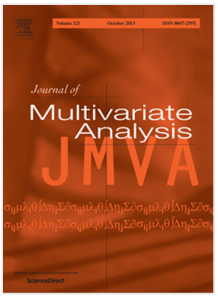

Empirical likelihood confidence tubes for functional parameters in plug-in estimation

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Empirical likelihood confidence tubes for functional parameters in plug-in estimation

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Abstract

We consider the infinite-dimensional inference problem in which the parameter of interest is a multivariate trajectory that can be written as an explicit functional T of a number of probability distributions. We propose an empirical likelihood procedure to build simultaneous confidence regions for these trajectories. Our main assumption is the Hadamard differentiability of T under norms adapted to empirical measures, i.e., supremum norms indexed by Donsker classes of functions. In order to handle practical computational issues, the proposed method, which we prove to be consistent, is based on a first order expansion of T. We also prove a general result of independent interest in empirical likelihood theory. Three applications are provided.

Keywords: Empirical likelihood, Empirical process, Semiparametric model

1. Introduction and statement of the results

1.1. Empirical likelihood in the framework of plug-in estimation

Consider a model, i.e., a nonparametric family $\mathcal{P}$ of probability measures on a measurable space $(\mathcal{X}, \mathcal{T})$, and a map T from $\mathcal{P}$ to a normed vector space $(E, ||\cdot||)$. Let $P_0 \in \mathcal{P}$ be the common law of an independent, identically distributed (i.i.d.) sequence $(X_i)_{i\geq 1}$ based on a probability space $(\Omega, \mathcal{A}, \Pr)$. Let θ_0 be an unknown parameter which can be written as $\theta_0 = T(P_0)$. Denoting by δ_x the Dirac mass at point x, a natural, plug-in estimator of θ_0

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