Bootstrap method for misspecified ergodic Lévy driven stochastic differential equation models

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Abstract

In this paper, we consider possibly misspecified stochastic differential equation models driven by Lévy processes. Regardless of whether the driving noise is Gaussian or not, Gaussian quasi-likelihood estimator can estimate unknown parameters in the drift and scale coefficients. However, in the misspecified case, the asymptotic distribution of the estimator varies by the correction of the misspecification bias, and consistent estimators for the asymptotic variance proposed in the correctly specified case may lose theoretical validity. As one of its solutions, we propose a bootstrap method for approximating the asymptotic distribution. We show that our bootstrap method theoretically works in both correctly specified case and misspecified case without assuming the precise distribution of the driving noise.

Keywords Misspecified model · Lévy driven stochastic differential equation · Bootstrap method

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