Simplified quasi-likelihood analysis for a locally asymptotically quadratic random field

Nakahiro Yoshida

Abstract

The IHK program is a general framework in asymptotic decision theory, introduced by Ibragimov and Hasminskii and extended to semimartingales by Kutoyants. The quasi-likelihood analysis (QLA) asserts that a polynomial type large deviation inequality is always valid if the quasi-likelihood random field is asymptotically quadratic and if a key index reflecting the identifiability is non-degenerate. As a result, following the IHK program, the QLA gives a way to inference for various nonlinear stochastic processes. This paper provides a reformed and simplified version of the QLA and improves accessibility to the theory. As an example of the advantages of the scheme, the user can obtain asymptotic properties of the quasi-Bayesian estimator by only verifying non-degeneracy of the key index.

Keywords

Ibragimov-Has’minskii theory · Quasi-likelihood analysis · Polynomial type large deviation · Random field · Asymptotic decision theory · Non-ergodic statistics