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Gaussian quasi-information criteria for ergodic Lévy driven SDE

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Abstract

We consider relative model comparison for the parametric coefficients of an ergodic Lévy driven model observed at high-frequency. Our asymptotics is based on the fully explicit two-stage Gaussian quasi-likelihood function (GQLF) of the Euler-approximation type. For selections of the scale and drift coefficients, we propose explicit Gaussian quasi-AIC and Gaussian quasi-BIC statistics through the stepwise inference procedure, and prove their asymptotic properties. In particular, we show that the mixed-rates structure of the joint GQLF, which does not emerge in the case of diffusions, gives rise to the non-standard forms of the regularization terms in the selection of the scale coefficient, quantitatively clarifying the relation between estimation precision and sampling frequency. Also shown is that the stepwise strategies are essential for both the tractable forms of the regularization terms and the derivation of the asymptotic properties of the Gaussian quasi-information criteria. Numerical experiments are given to illustrate our theoretical findings.

Keywords AIC · BIC · Ergodic Lévy driven SDE · Stepwise Gaussian quasi-likelihood estimation

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