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Martingale estimation functions for discretely observed diffusion processes. (English)

Zbl 0830.62075

Bernoulli 1, No. 1-2, 17-39 (1995).

Summary: We consider three different martingale estimating functions based on discrete-time observations of a diffusion process. One is the discretized continuous-time score function adjusted by its compensator. The other two emerge naturally when optimality properties of the first are considered. Subject to natural regularity conditions, we show that all three martingale estimating functions result in consistent and asymptotically normally distributed estimators when the underlying diffusion is ergodic.

Practical problems with implementing the estimation procedures are discussed through simulation studies of three specific examples. These studies also show that our estimators have good properties even for moderate sample sizes and that they are a considerable improvement compared with the estimator based on the unadjusted discretized continuous-time likelihood function, which can be seriously biased.

MSC:

62M05 Markov processes: estimation; hidden Markov models

60H10 Stochastic ordinary differential equations (aspects of stochastic analysis)

60G44 Martingales with continuous parameter

Cited in **1** Review

Cited in **105** Documents

Keywords:

consistency; quasi-likelihood; asymptotic normality; Ornstein-Uhlenbeck process; mean-reverting process; martingale estimating functions; discrete-time observations; diffusion process; discretized continuous-time score function; optimality; ergodic; simulation

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