

Efficient estimation for ergodic SDE models sampled at high frequency

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Abstract

Simple and easily checked conditions are given that ensure rate optimality and efficiency of estimators for ergodic SDE models in a high frequency asymptotic scenario, where the time between observations goes to zero while the observation horizon goes to infinity. For diffusion models rate optimality is important because parameters in the diffusion coefficient can be estimated at a higher rate than parameters in the drift. The criteria presented in the talk provide, in combination with considerations of computing time, much needed clarity in the profession of estimators that have been proposed for parametric diffusion models. The focus is on approximate martingale estimating functions for discrete time observations. This covers most of the previously proposed estimators, and the few that are not covered are likely to be less efficient, because non-martingale estimating functions, in general, do not approximate the score function as well as martingales.

Optimal martingale estimating functions in the sense of Godambe and Heyde have turned out to provide simple estimators for many SDE models. These estimating functions are approximations to the score functions, which are rarely explicitly known, and have often turned out to provide estimators with a surprisingly high efficiency. This can now be explained: the estimators are, under weak conditions, rate optimal and efficient in the high frequency asymptotics considered in the talk.