

Discriminant analysis for stochastic differential equations based on sampled data

Masayuki Uchida

Osaka University, Osaka, Japan and Japan Science and Technology Agency, CREST

E-mail: uchida@sigmath.es.osaka-u.ac.jp

We consider a discriminant analysis for stochastic differential equations based on discrete observations. Under the situation where a discretely observed ergodic diffusion process belongs to one of two diffusion models Π_1 and Π_2 , two kinds of classification criteria based on discriminant functions are proposed and asymptotic properties of the discriminant functions are obtained. The discriminant functions are constructed by using adaptive maximum likelihood type estimators, which are derived from training data. Moreover, a discriminant rule for stochastic differential equations from sampled data observed on the fixed interval is treated and the asymptotic distribution of the discriminant function is presented. We also show the misclassification probabilities based on the classification criteria converge to zero. This is a joint work with Nakahiro Yoshida.

Key Words: Classification criterion, ergodic diffusion process, discrete time observations, maximum likelihood type estimator, misclassification probability, non-ergodic, stable convergence, stochastic differential equation.