Quadratic Variation Estimators for

Diffusion Modelsin Finance

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Abstract

This talk is about an efficient algorithm for parameter estimation in financial diffusion models. When there is a multivariate diffusion model with many unknown parameters, evaluation of likelihood function is complicated and regular maximum likelihood estimation does not necessarily work well due to numerical stability problems. Besides, in many financial applications, we would like to estimate the parameters of diffusion coefficients of a model without knowledge of drift coefficients. Quadratic Variation Estimator (QVE) is hence proposed in the paper to solve these estimation problems. Numerical experiments and consistency proof reveal the accuracy of the estimators for Ornstein-Uhlenbeck model, Vasicek interest rate model, CIR interest rate model, and Heston stochastic volatility model. The same method can be applied to a wider class of univariate diffusion models and many multivariate diffusion models, such as multi-asset models and a class of stochastic volatility models.