

Estimation of Stochastic Diffusion Models

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Abstract: Several Markov chain Monte Carlo (MCMC) methods have been proposed in the literature to estimate stochastic diffusion models with stochastic volatility. Most of the methods either do not consider the leverage effects or require intensive computation. In this paper, we investigate the difficulty of estimating the leverage effect and propose an effective method to overcome the difficulty. The proposed method uses the technique of forward filtering and backward sampling to improve the computing efficiency and employs nonlinear filters to estimate leverage effects. We also consider models with time-varying drift and jumps in the returns and volatility. A U.S. interest rate series and the S&P 500 index are used to demonstrate the proposed method and to compare with the existing methods.