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SPECIAL ISSUE: BAYESIAN INFERENCE AND STOCHASTIC COMPUTATION

Simulated likelihood inference for stochastic volatility models using continuous particle filtering

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Abstract Discrete-time stochastic volatility (SV) models have generated a considerable literature in financial econometrics. However, carrying out inference for these models is a difficult task and often relies on carefully customized Markov chain Monte Carlo techniques. Our contribution here is twofold. First, we propose a new SV model, namely SV–GARCH, which bridges the gap between SV and GARCH models: it has the attractive feature of inheriting unconditional properties similar to the standard GARCH model but being conditionally heavier tailed. Second, we propose a likelihood-based inference technique for a large class of SV models relying on the recently introduced continuous particle filter. The approach is robust and simple to implement. The technique is applied to daily returns data for S&P 500 and Dow Jones stock price indices for various spans.

Keywords Stochastic volatility · Particle filter · Simulated likelihood · State space · Leverage effect · Jumps