



SUMMONS

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LUND UNIVERSITY

School of Economics and Management

Department of Statistics

## SEMINAR

Wednesday 15 December 2010 at 13.15 in room 1048.

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*Sequential calibration of options*

*Robust calibration of option valuation models to quoted option prices is non-trivial but crucial for good performance. A framework based on the state-space formulation of the option valuation model is introduced. Non-linear (Kalman) filters are needed to do inference since the models have latent variables (e.g. volatility). The statistical framework is made adaptive by introducing stochastic dynamics for the parameters. This allows the parameters to change over time, while treating the measurement noise in a statistically consistent way and using all data efficiently. The performance and computational efficiency of standard and iterated extended Kalman filters (EKF and IEKF) are investigated. These methods are compared to common calibration such as weighted least squares (WLS) and penalized weighted least squares (PWLS). A simulation study, using the Bates model, shows that the adaptive framework is capable of tracking time varying parameters and latent processes such as stochastic volatility processes. It is found that the filter estimates are the most accurate, followed by the PWLS estimates. The estimates from all of the advanced methods are significantly closer to the true parameters than the WLS estimates which overfits data. The filters are also faster than least squares methods. All calibration methods are also applied to daily European option data on the S&P 500 index, where the Heston, Bates and NIG-CIR models are considered. The results are similar to the simulation study and it can be seen that the overfitting is a real problem for the WLS estimator when applied complex models.*

Welcome!