

In this thesis we consider a stochastic volatility model based on non-Gaussian Ornstein-Uhlenbeck process (see also Barndorff-Nielsen and Shephard [1]) where the logarithm of an asset price is the solution of a stochastic differential equation without drift. The volatility component is modelled as a stationary, latent Ornstein-Uhlenbeck process, driven by a non-Gaussian Lévy process. We perform Bayesian inference for model parameters by means of Markov chain Monte Carlo algorithm based on data augmentation. The algorithm corresponds to a standard hierarchical parametrization of the model. The aim of this thesis is to express the unobserved stochastic volatility process for observed asset price. The algorithm is applied to the simulated and real asset price where real asset price is US dollar (USD) - Pound sterling (GBP) exchange rate.