

Stochastic Model Specification Search for Gaussian and Partially Non-Gaussian State Space Models

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State space models are a widely used tool in time series analysis to deal with processes which gradually change over time. Model specification however is a difficult task as one has to decide which components to include in the model specification and to specify whether these are fixed or stochastic.

In the Bayesian approach, model selection relies on the posterior probabilities of a model given the data. These can be determined for each model separately by using Bayes' rule, which requires computation of the marginal likelihood for each model. The modern Bayesian approach is to apply a model space MCMC method by sampling jointly model indicators and parameters.

In this talk we present a model space MCMC method developed by Frühwirth-Schnatter and Wagner (2010) for Gaussian as well as non-Gaussian state space models (binary data, multinomial data, count data). This approach is applied to choose appropriate components in a structural time series model and to decide, whether these components are deterministic or stochastic. For non-Gaussian state space models the stochastic model search MCMC method makes use of auxiliary mixture sampling developed in Frühwirth-Schnatter and Wagner (2006) for count data and in Frühwirth-Schnatter and Frühwirth (2007) for binary and multinomial data.

References

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