István Barra

Bayesian analysis of nonlinear, non-Gaussian state space models: the joint independent Metropolis-Hastings method

(coauthored by Lennart Hoogerheide, Siem Jan Koopman and André Lucas)

VU University Amsterdam, The Netherlands, i.barra@vu.nl

In this paper we propose a new methodology for the Bayesian analysis of nonlinear non-Gaussian state space models where the signal is univariate and Gaussian. The novelty is on the development of a proposal density for the joint posterior distribution of parameters and states. We aim to approximate the posterior of the parameters with a mixture of t-densities and to construct a Gaussian density for approximating the density of the states given the parameters and the data. Our approach is an alternative to other recent developments in the literature. We demonstrate that using our proposal density in an independent Metropolis- Hastings procedure is highly efficient. Finally our method can be combined with importance sampling and can be used for the fast evaluation of marginal likelihoods.