Journal of Statistical Computation and Simulation ›
Volume 81, 2011 - Issue 11

Original Articles

Gibbs sampling methods for Bayesian quantile regression

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Pages 1565-1578 | Received 27 Jul 2009, Accepted 23 May 2010, Published online: 17 Mar 2011

Cite this article https://doi.org/10.1080/00949655.2010.496117

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Abstract

This paper considers quantile regression models using an asymmetric Laplace distribution from a Bayesian point of view. We develop a simple and efficient Gibbs sampling algorithm for fitting the quantile regression model based on a location-scale mixture representation of the asymmetric Laplace distribution. It is shown that the resulting Gibbs sampler can be accomplished by sampling from either normal or generalized inverse Gaussian distribution. We also discuss some possible extensions of our approach, including the incorporation of a scale parameter, the use of double exponential prior, and a Bayesian analysis of Tobit quantile regression. The proposed methods are illustrated by both simulated and real data.

Keywords:

asymmetric Laplace distribution | Bayesian quantile regression | double exponential prior | generalized inverse Gaussian distribution | Gibbs sampler | Tobit quantile regression

Acknowledgements

The authors are grateful to an associated editor and two anonymous referees for their useful comments, which improved an earlier version of the paper. This research is partly supported by Grants-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology of Japan. The computational results are obtained using Ox version 5.10 34.