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Gibbs sampling methods for Bayesian quantile regression

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66 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

Related Research Data

Non-Gaussian Ornstein–Uhlenbeck-based Models and Some of Their Uses in Financial Economics
Source: Journal of the Royal Statistical Society Series B (Statistical Methodology)

Regression Quantiles
Source: Econometrica

An Alternative Estimator for the Censored Quantile Regression Model
Source: Econometrica

Bootstrapping Quantile Regression Estimators
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Markov Chain Monte Carlo Methods: Computation and Inference
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