State Space Mixed Models for Binary Responses with Scale Mixture of Normal Distributions Links

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Abstract

A state space mixed models for binary time series where the inverse link function is modeled to be a cumulative distribution function of the scale mixture of normal (SMN) distributions. Specific inverse links examined include the normal, Student-t, slash and the variance gamma links. The threshold latent approach to represent the binary system as a linear state space model is considered. Using a Bayesian paradigm, an efficient Markov chain Monte Carlo (MCMC) algorithm is introduced for parameter estimation. The proposed methods are illustrated with real data sets. Empirical results showed that the slash inverse link fits better over the usual inverse probit link.

Keywords: Binary time series, Longitudinal data, Markov chain Monte Carlo, Particle learning, Probit Scale mixture of normal links, Sequential Monte Carlo, State space models.