

Bayesian Skew-Normal Regression Models

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In regression models, the assumption of normality of the errors may be questionable in cases where there are outliers, when the data have heavy tails or when the behavior of the data proves to be asymmetric. To overcome these weaknesses, without transformation of the data, we can use distributions of heavy tails, skewed distributions or other distributions. The skew-normal distribution has proved to be useful to calculate the bias in data with asymmetric behavior. Skewness is extremely important in different areas such as finance, economics, actuarial science, medicine, biology, investing, among others.

The skew-normal distribution was first introduced by O'Hagan and Leonard (1976), but was Azzalini (1985), who conducted study on the construction of the family of univariate skew-normal distributions. Azzalini and Dalla-Valle (1996), extend the univariate skew-normal distribution to the multivariate case. Later, Sahu et al (23) proposed a new family of normal skewed distributions, which differ slightly in the proposals for Azzalini. The skew-normal distribution is a family of distributions with an additional parameter of bias. Some application of the skew-normal regression are presented in Azzalini (1996), under a classic method.

In this paper we propose a Bayesian methodology to fit skew-normal regression models, where the location, scale and skewness parameters follows regression structures, assuming the skew normal distributions proposed by Azzalini (1985) and Sahu (2003). For the implementation of the proposed methodology, results of simulations and Biological applications are presented.

Keywords: Bayesian analysis, Skewed-normal distribution, Regression models.

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