THE DEVIANCE INFORMATION CRITERION AS A BAYESIAN MEASURE OF MODEL ASSESSMENT FOR EXTREME VALUES
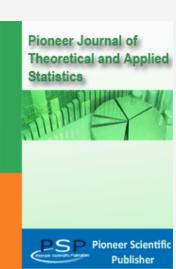
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Abstract

Assessing the fit of a model is an important final step in any statistical analysis. The scope of Bayesian model assessment is quite broad, and can be investigated via model diagnostics, goodness-of-fit measures, or posterior model probabilities (or Bayes factors). In this paper, we discuss the use of the deviance information criterion, a Bayesian criterion for model assessment and model comparison, for the assessment, selection and comparison of extreme value models. The deviance information criterion is derived for various extreme value distributions and the fit of the models assessed. The paper also proposes the use of the deviance information criterion as a method of threshold selection when using the peaks-over threshold (POT) approach to fitting a distribution to the tail of a data set. The deviance information criterion simultaneously selects the threshold and estimates other parameters of a model under consideration, thus taking naturally into account threshold uncertainty that is associated with fixed-threshold approach. The ideas are demonstrated through application to simulated and real data sets.