Bhattacharya, D.; **Samaneigo, F. J.**; **Vestrup, E. M.**

On the comparative performance of Bayesian and classical point estimators under asymmetric loss. (English) Zbl 1192.62059

Sankhyā, Ser. B 64, No. 3, 239-266 (2002).

Summary: A comparison between Bayes and classical estimators was executed by *F.J. Samaniego* and *D.M. Reneau* [J. Am. Stat. Assoc. 89, No. 427, 947–957 (1994; Zbl 0804.62005)] in a univariate context involving exponential families, conjugate priors and squared error loss. In that study, the Bayes risk with respect to a hypothesized true distribution of the unknown parameter was taken as the criterion by which estimators were evaluated, with the (possibly degenerate) true prior serving as a representation of the true state of nature. The main outcome of that work was the identification of the threshold separating the class of priors available to the statistician into those that outperform the best classical estimator from those that do not. It was found that, in general, Bayes rules outperformed classical rules unless the operational prior used was poorly centered and also placed a substantial amount of weight on the prior mean.

In the present work, a comparative analysis is executed when the loss function is asymmetric. More specifically, the performance of Bayes and classical point estimators, as measured by the Bayes risk relative to a fixed true prior distribution, is assessed when the loss function is the LINEX (linear exponential) loss criterion introduced by *H.R. Varian* [Econometrica 43, 985–986 (1975; Zbl 0319.90015)]. We examine a variety of parametric paradigms, and also investigate a univariate estimation problem which arises in a regression framework. We obtain a number of analytical results pertaining to special cases in which the operational prior is "mean-correct" (that is, has the same mean as the true prior) or is highly diffuse. In general, both of these circumstances tend to favour the Bayesian approach.

MSC:

62F10 Point estimation
62F15 Bayesian inference

Keywords:

LINEX loss; Bayes estimator; multivariate normal; linear regression; Poisson; mean-correct priors; maximum likelihood

Full Text: Link