Comments to

Objective Bayesian Point and Region Estimation in Location-Scale Models

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Let me begin by congratulating Professor Bernardo for their excellent job in objective Bayesian analysis. This paper, and the closely related Bernardo(2005), present a unified theory of estimation by point and credible regions based on information ideas he has used previously to define reference priors. The idea originates from the study of both problems as decision problems, where the loss function is the "intrinsic discrepancy" inspired in the Kullblack-Leibler divergence, and defined as the minimum of $k_x\{\widetilde{\theta}, \widetilde{\lambda}|\theta, \lambda\}$ and $k_x\{\theta, \lambda|\widetilde{\theta}, \widetilde{\lambda}\}$ where

$$k_x\{\widetilde{\theta}, \widetilde{\lambda}|\theta, \lambda\} = \int_{\chi(\theta,\lambda)} \pi(x|\theta, \lambda)\; ln\frac{\pi(x|\theta, \lambda)}{\pi(x|\widetilde{\theta}, \widetilde{\lambda})}dx$$

An intrinsic point estimator is then defined as the Bayes estimator which corresponds to the intrinsic loss and the appropriate reference prior. A p-credible intrinsic region estimator is defined as the lowest posterior loss p-credible with respect to the intrinsic loss and the appropriate reference prior.

A first question is: do we need to employ

$$\int_{C_p^{int}} \pi(\theta|x)d\theta \geq p$$

with the inequality instead of equality to allow the discrete case?

Second, it would be useful to have a better understanding of the proposed approach to applying these ideas to the exponential distribution family instead of location-scale models; this is a family of distributions greater than the other.

The professor Bernardo claims that in one-dimensional problems, one may define probability centred credible intervals, and theses are invariants under reparametrization. It will not be necessary to suppose that the transformation is monotonic?

Third, on a more philosophical basis, I think that invariance is a compelling argument for point estimations and for credible regions. Indeed both point estimations and credible regions are two answers to the same question: how we can eliminate the uncertainty about θ. The Bernardo's approach permits one to obtain invariance under reparametrization in both problems.

Fourth, the examples picked up show the coherence between frequentist inference and Bayesian inference. When intrinsic credible regions, that requires minimal subjective inputs, are employed exact frequentist confidence regions are obtained, at least in the normal mean and variance. This fact is similar to the one obtained by this discussant in Gómez-Villegas and González-Pérez (2005) and references therein. I wonder if Professor Bernardo has any idea about the essential reasons behind the matching properties between intrinsic credible regions and confidence regions in these cases?

Fifth, adopting this approach to credible set construction, I see problems in computations, the posterior intrinsic loss integrated over a large dimensional space. From the point of view of applications, a simple asymptotic approximation to normality should be necessary.

In closing, I would like to thank the editor of the journal for giving me the opportunity of discussing this paper.

References

Bernardo, J.M. (2005) Intrinsic credible regions: an objective Bayesian approach to interval estimation. *Test*, **14**, 2, 317-384.

Gómez-Villegas, M.A. and González-Pérez, B. (2005) Bayesian analysis of contingency tables. *Communications in Statistics-Theory and Methods*, **34**, 1743-1754.