

4 Conditional and Partial predictive p -values nowadays

Maria Eugenia Castellanos (Universidad Rey Juan Carlos)

Bayarri and Berger worked on conditional and partial measures of surprise for goodness of fit of Bayesian models in presence of unknown parameters dating back from ISDS Discussion Paper, 1997 up to JASA 2000. They highlighted the problem of “double use” of data by the posterior predictive p -value, and the necessity of other measures for model checking from an objective point of view. In particular, conditional and partial p -values have been more frequently used because they have an appealing property, when considered as random variables, $p(X)$, their null distribution is uniform, at least asymptotically. This endorses p -values with a very desirable property, namely having the same interpretation across problems.

In the context of hierarchical models, Bayarri and Castellanos paper (2007, Statistical Science) adapted these measures to assess the goodness of fit of this type of models. The present work reviews these measures and the use of them from its origin to these days. A summary of other Bayesian measures for goodness of fit is also presented.

(Inspired on my work with Susie Bayarri.)