

Influence analysis in certain parametric models

Inmaculada Barranco-Chamorro¹ and Juan L. Moreno-Rebollo¹

¹ Department of Statistics and Operation Research, Faculty of Mathematics, University of Seville, Spain

Papers dealing with influence analysis topics can be found in nearly all statistical techniques and models. However, there are scarce references studying influence analysis in parametric models. We can cite as examples: Kim [1] studied local influence in multivariate normal data; Poon and Tang [2] developed influence measures for parametric models of lifetime data, applications of their results to clinical trials can also be seen in [2]; and Nyangoma, Fung and Jansen [3] proposed diagnostics to explain departures from the multinomial model and used their results to give insight into genetic data for paternity.

In this paper we get results for the uniformly minimum variance unbiased estimator (UMVUE) in certain parametric models: exponential and non-regular families of distributions. The proposed measures are the conditional bias and the asymptotic mean sensitivity curve (see [4]). They are connected with the Hampel's influence function and can also be considered case-deletion influence diagnostics. In order to illustrate our theoretical results, some simulations have been carried out for different parametric functions when sampling from an exponential distribution. From these simulations we can conclude that the proposed measures depend on parametric function under consideration and the true and unknown value of the parameter. Note that we could proceed similarly with data from a variety of applied areas.

References

- [1] Kim MG (1996) Local influence in Box-Cox transformation for multivariate regression data. *Communication in Statistics. Theory and Methods* 1:145-151.
- [2] Poon WY and Tang ML (2001) Influence measure in maximum likelihood estimate for models of lifetime data. *Journal of Applied Statistics* 6:737-742.
- [3] Nyangoma SO, Fung WK and Jansen RC (2006) Identifying influential multinomial observations by perturbation. *Computational Statistics & Data Analysis* 50(10):2799-2821 .
- [4] Barranco-Chamorro I, Moreno-Rebollo JL (2008) Some measures of robustness for unbiased estimators in one-parameter natural exponential families with quadratic variance function. *Journal of Mathematical Analysis and Applications* (to appear).