

Directional inference for vector parameters

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Abstract

We consider inference on a vector-valued parameter of interest in a linear exponential family, in the presence of a finite-dimensional nuisance parameter. Based on higher order asymptotic theory for likelihood, we propose a directional test whose p-value is computed using one-dimensional integration. For discrete responses this extends the development of Davison et al. (2006), and some of our examples concern testing in contingency tables. For continuous responses the work extends the directional test of Cheah et al. (1994). Examples and simulations illustrate the high accuracy of the method, which we compare with the usual likelihood ratio test and with an adjusted version due to Skovgaard (2001). In high-dimensional settings, such as covariance selection, the approach works essentially perfectly, whereas its competitors can fail catastrophically. Extensions to non-linear exponential families and to general models are also sketched (joint with A.C. Davison, D.A.S. Fraser, N. Reid).

*url: <http://homes.stat.unipd.it/sartori/>