

CONFIDENCE DISTRIBUTIONS AND NUISANCE PARAMETERS

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We study hypothesis testing using confidence distributions for two parameters, where one of them is of interest and the other one is a nuisance parameter. Under asymptotic normality of parameter estimates, we introduce a framework where the ideas of integrating out or maximizing w.r.t the nuisance parameter (profiling) appear as extreme cases. In particular, three examples are considered: testing that the higher order parameter in an autoregressive process of order two is zero, testing that the moving average parameter is zero in the simplest autoregressive moving average model, ARMA(1,1), and testing equality of two binomial proportions. Overall, integrating is to be preferred over profiling, although problems can occur in the ARMA case due to identification issues. Moreover, in the binomial example, we illustrate how we may find a useful compromise between the two methods in terms of robustness of size when varying the nuisance parameter.

Keywords: confidence distribution, nuisance parameters, time series models, binomial proportions

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