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CALIBRATING SIGNIFICANCE LEVEL AND P-VALUES IN LINEAR MODELS

By

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We put forward an adaptive alpha for hypothesis tests in which linear nested models are compared which changes with the amount of sample information. This calibration may be interpreted as a Bayes-non-Bayes compromise, and leads to statistical consistency. Moreover, we prove that the Robust Lower Bound proposed by Sellke et al. [14] is a valid p-value in the sense of Casella and Berger [7]. Using this lower bound we build a calibration of p values for selecting nested linear models, the *"p Posterior Probability Linear"* (pPP_L) which maps p values into approximations of posterior probabilities taking into account the effect of sample sizes. This calibration is based on Pericchi and Pérez [12] and we present several illustrations from where it is apparent that the pPP_L closely approximates exact objective Bayes Factors. In particular, it has the same properties asymptotic as posterior probabilities but avoiding the problems of "Bayesian Information Criterion" (BIC) for small samples relative to the number of parameters.