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12. Probability and Statistics

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Empirical Bayes Estimators of Indexed Parameters of Exponential Families

An empirical Bayes procedure to estimate an indexed parameter of an exponential family distribution is introduced in a closed form. In that procedure it does not require to estimate the unknown prior density function of the unknown parameter of interest. Only one random sample with size n of independent observation from the considered distribution indexed by that unknown parameter is required to construct the procedure in the case of $n \geq 3$. Numerical simulation study using Monte Carlo method is done to compare the performance of that procedure with the Bayes procedure assuming gamma prior distribution on the unknown parameter of interest. Based on numerical study, the introduced empirical Bayes procedure is better (in the sense of having smaller rist function) than the Bayes procedure for the case in which the given random sample has a small size (less than or equal to 10).