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APPROXIMATED BAYES AND EMPIRICAL BAYES CONFIDENCE INTERVALS—THE KNOWN VARIANCE CASE*

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Abstract. In this paper hierarchical Bayes and empirical Bayes results are used to obtain confidence intervals of the population means in the case of real problems. This is achieved by approximating the posterior distribution with a Pearson distribution. In the first example hierarchical Bayes confidence intervals for the Efron and Morris (1975, *J. Amer. Statist. Assoc.*, **70**, 311–319) baseball data are obtained. The same methods are used in the second example to obtain confidence intervals of treatment effects as well as the difference between treatment effects in an analysis of variance experiment. In the third example hierarchical Bayes intervals of treatment effects are obtained and compared with normal approximations in the unequal variance case.

Key words and phrases: Hierarchical Bayes, empirical Bayes estimation, Stein estimator, multivariate normal mean, Pearson curves, confidence intervals, posterior distribution, unequal variance case, normal approximations.