Higher-order likelihood inference in meta-analysis using *R*

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Standard likelihood inference is known to improve common non-likelihood techniques in meta-analysis (Hardy and Thompson, 1996). Nevertheless, relying on typical first-order approximations, as for example the χ^2 distribution for Wald and likelihood ratio statistics, can give rise to inaccurate results. This drawback is a consequence of small sample sizes, which are typical in meta-analysis. Resorting to the theory of higher-order asymptotics provides remarkably more precise results than first-order counterpart. See, for example, Severini (2000) and Brazzale et al. (2007) for a general overview of higher-order asymptotics. We present an *R* package which implements first-order likelihood inference and the second-order adjustment to the log-likelihood ratio statistic of Skovgaard (2006), either for meta-analysis and meta-regression problems, following the results in Guolo (2011). The package allows inference on fixed- and random-effect components of linear mixed models used in meta-analysis. The functionality of the package will be illustrated on a real example from the medical literature.

References

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