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Conditional Akaike information for mixed-effects models. (English) Zbl 1094.62077
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Summary: This paper focuses on the Akaike information criterion, AIC, for linear mixed-effects models in the analysis of clustered data. We make the distinction between questions regarding the population and questions regarding the particular clusters in the data. We show that the AIC in current use is not appropriate for the focus on clusters, and we propose instead the conditional Akaike information and its corresponding criterion, the conditional AIC, cAIC. The penalty term in cAIC is related to the effective degrees of freedom ρ for a linear mixed model proposed by *J. S. Hodges* and *D. J. Sargent* [ibid. 88, No. 2, 367–379 (2001; [Zbl 0984.62045](#))]; ρ reflects an intermediate level of complexity between a fixed-effects model with no cluster effect and a corresponding model with fixed cluster effects. The cAIC is defined for both maximum likelihood and residual maximum likelihood estimation. A pharmacokinetics data application is used to illuminate the distinction between the two inference settings, and to illustrate the use of the conditional AIC in model selection.

MSC:

- [62J05](#) Linear regression; mixed models
- [62B10](#) Statistical aspects of information-theoretic topics
- [62P10](#) Applications of statistics to biology and medical sciences; meta analysis
- [62J10](#) Analysis of variance and covariance (ANOVA)

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Keywords:

[Akaike information](#); [AIC](#); [Effective degrees of freedom](#); [Linear mixed model](#); [Cadrilazine data](#)

Software:

[MEMSS](#)

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