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Modeling and analysis of method comparison data with skewness and heavy tails. (English)

Zbl 1341.62131

Choudhary, Pankaj K. (ed.) et al., Ordered data analysis, modeling and health research methods. In honor of H. N. Nagaraja's 60th birthday. Selected papers based on the presentations at the international conference, Austin, TX, USA, March 7–9, 2014. Cham: Springer (ISBN 978-3-319-25431-9/hbk; 978-3-319-25433-3/ebook). Springer Proceedings in Mathematics & Statistics 149, 169-187 (2015).

Summary: The analysis of method comparison data is mainly concerned with evaluating agreement between methods of measuring a continuous variable. The methodology commonly assumes normally distributed data, which are usually modeled using a standard linear mixed model that assumes normality for both random effects and errors. In practice, however, the data often exhibit skewness and have tails heavier than those of a normal distribution, possibly due to outlying observations. When such data are analyzed using the standard mixed model, the non-normality may become apparent from model diagnostics. This article develops a methodology for agreement evaluation by modeling data using a recent robust mixed model that assumes a skew- t distribution for random effects and an independent t -distribution for errors. As the standard model is a special case of the robust model, the new methodology offers a unified framework for analyzing data with skewness and heavy tails as well as normally distributed data. The methodology is presented for both unreplicated and replicated data. A real example is used for illustration.

For the entire collection see [[Zbl 1337.92005](#)].

MSC:

[62H12](#) Estimation in multivariate analysis

[62H10](#) Multivariate distribution of statistics

Keywords:

[concordance correlation](#); [heavy tailed distribution](#); [mixed effects model](#); [robust model](#); [skew- \$t\$ distribution](#); [total deviation index](#)

Software:

[MEMSS](#); [R](#); [S-PLUS](#); [numDeriv](#); [Statmod](#); [mvnormtest](#)

Full Text: [DOI](#)

References:

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