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Optimization of the size of nonsensitivness regions. (English) Zbl 1091.62521

Appl. Math., Praha 47, No. 1, 9-23 (2002).

The standard statistical procedures based on a linear regression model are influenced by the inaccuracy $\delta\vartheta$ in the value of variance components. In the paper, its effect is considered on the risk of a standard test. Let the risk α be worse by ϵ, i.e., let the level of the test be $\alpha+\epsilon$. The nonsensitivness region $\mathcal{R}_\epsilon$ is introduced by the condition that the risk does not exceed $\alpha+\epsilon$ for all $\delta\vartheta \in \mathcal{R}_\epsilon$, see *L. Kubáček* [Appl. Math., Praha 41, 433–445 (1996; Zbl 0870.62056)] for details.

First, two lemmas concerning the distribution of quadratic forms are proved and used in what follows. Then a test concerning the value of a vectorial first order parameter β of a normally distributed n-dimensional random vector $Y \sim N_n(X\beta, \Sigma(\vartheta))$ is considered (the design matrix X is known). The aim of the paper is to optimize the size of the corresponding region $\mathcal{R}_\epsilon$. Two numerical examples complete the paper.

Reviewer: Ivan Saxl (Praha)

MSC:

62J05 Linear regression; mixed models
62H15 Hypothesis testing in multivariate analysis
62J10 Analysis of variance and covariance (ANOVA)

Keywords:

linear model with inaccurate variance components; nonsensitiveness regions

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