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**Optimization of the size of nonsensitiveness 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  $\alpha$  be worse by  $\epsilon$ , i.e., let the level of the test be  $\alpha + \epsilon$ . The nonsensitiveness 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  $\beta$  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)

Cited in **3** Documents

**Keywords:**

[linear model with inaccurate variance components; nonsensitiveness regions](#)

**Full Text:** [DOI](#) [EuDML](#)

**References:**

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- [2] J. Janko: *Statistical Tables*. Academia, Praha, 1958.
- [3] L. Kubáček: Linear model with inaccurate variance components. *Appl. Math.* 41 (1996), 433-445. · [Zbl 0870.62056](#)
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