

КРИТИКА — REVIEWS

Karl-Rudolf Koch: Parameter Estimation and Hypothesis Testing in Linear Models. Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo, 1988, 378 pp., 17 figs., soft cover.

This textbook is a translation, with slight modifications and additions, of the second German edition of *Parameterschätzung und Hypothesentests in linearen Modellen*, published by Ferd. Dümmlers Vlg. in Bonn, 1987. The reader will find a self-contained presentation of the methods of estimating unknown parameters, testing hypotheses and estimating intervals. The book is divided into 5 chapters.

The required vector and matrix algebra is presented in Chap. 1. This chapter also contains the generalized inverses, which are used for estimating parameters in models which are not of full rank, and presents the projections, which serve the geometrical interpretation of the estimation. Chapter 2 deals with the probability theory. First the probability of random events is introduced by axioms. The random variables are then defined and the most important univariate and multivariate distributions are derived together with the test distributions for the univariate and multivariate models of estimating parameters. Chapter 3 deals with parameter estimation in linear models. The coefficients are assumed to be fixed. The unknown parameters are considered as fixed quantities as well as random variables. The chapter covers topics varying from the Gauss-Markoff model and the analysis of variance to the multivariate model, the model with unknown variance and covariance components, the regression model and the mixed model for the combined estimating of fixed and random parameters. The latter case leads to the prediction and filtering of observations and signals. Chapter 4 is devoted to hypothesis testing, to interval estimation and to testing of outliers in the Gauss-Markoff model. The test of outliers may be also applied in the mixed model. The same holds true for hypothesis testing and interval estimation of fixed parameters. Finally Chap. 5 gives a short review of discriminant analysis. The topic has a close connection to the estimation of parameters in multivariate models. The statistical decision theory and classification based on the normal distribution are briefly discussed.

The book is rich in content though of condensed form. The presented material is well-balanced. In all parts it gives a representative picture of the topic discussed. The theorems are proved with only a few exceptions. The usefulness of the book is enhanced by a number of examples with particular emphasis on the geodetic application. The reader will appreciate the extensive and up-to-date bibliography as well as the cross references in the text. In general the book successfully combines three important standards: the contact with the present state of art in the field discussed, applications and a high didactic value. The book is an absolute must for students of geodesy. But also researchers, engineers and members of other professions should find this book useful. The book can be recommended as an excellent aid to everyone dealing with statistical inference.

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