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Book Reviews

BOOK REVIEWS

Kubáček, L.—Kubáčková, L.:
STATISTICS AND METROLOGY (Czech).
Univerzita Palackého v Olomouci – vydavatelství, Olomouc 2000, 307 pp.
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We want with a delay call attention to a monograph that surely will exert influence upon statisticians active in processing, evaluation and design of measurement experiments and upon metrologists interested to penetrate into mathematical-statistical theory of measurement. The reviewed book is written by two experts who during their whole scientific activity have been interested in this topic and have achieved worldwide-deserved recognition. The monograph is a summary of today's state and indicator to the future of Statistics in Measurement science. It is divided into 6 chapters.

Chapter 1 is devoted to brief mathematical-statistical account of the concept and target of an experiment.

Chapter 2 deals with mathematical-statistical characteristics of the measurement technique.

Chapter 3 presents the mathematical-statistical theory of design of experiment for metrologists. The basic concepts are criterions of optimality, theorems on equivalency with chosen optimality criterion, iterative determination of an optimal design, stopping rules for iterations and, finally, practical hints for using the optimal design of experiment.

Chapter 4 is an introduction and survey of basic linear measurement models (directly and indirectly measured vector parameter) and of statistical inferences concerning unknown mean and covariance matrix in above mentioned models. Attention is given to indirect measured vector parameter models with constraints of type I and type II.

Linear models with special structures, such as replicated models, models with nuisance parameters, calibration models and standard networks are analyzed in **Chapter 5**. There is a uniform mathematical-statistical theory of these structures, formulas for application are derived in theorems and rigorously proved.

Chapter 6 is dedicated to nonlinear models. It starts with nonlinear error propagation. Linearization of a nonlinear model by the help of a suitable transformation follows. The main goal is the use of Taylor expansion. Suggested are various criteria for determination the influence of linearization on the bias of the individual estimators of

 (i) unknown parameters of the mean,
 (ii) the covariance matrix scalar factor,
 (iii) the variance components in mixed linear models.

Again, formulas are derived and proved in models without constraints and in models with constraints on parameters of type I and II.

Finally, in **References** one can find practically all important sources of mathematical-statistical literature for statisticians and metrologists interested and working in given area. Ideas, theories and solutions given or rising in this monograph would certainly point out the way in development the Statistics for Metrology. That is why a hot recommendation is to translate the monograph in English.

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