Book review

Caspary, W. und K. Wichmann: *Lineare Modelle. Algebraische Grundlagen und statistische Anwendungen*. R. Oldenbourg, München 1994. XII + 382pp.

This book aims at providing the necessary algebraic tools for estimation and testing in linear models. Furthermore, a variety of statistical concepts, results and issues occurring in the lineare model is treated. It should serve both as a textbook for the interested student as well as for the scientist who wishes to be informed about the recent development in this area.

Although the authors come from an engineering background they succeed in presenting a monograph free of bias towards applications in their own field of teaching and research.

To a large extent the presentation of the material is based on the concept of generalized inverses of matrices and projectors (oblique and orthogonal), and treatment of algebraic questions and problems is emphasized. Knowledge of the fundamental facts of statistics is taken for granted. The second half of the book mainly deals with the topics from linear models. Equivalences and transformations between the different models are extensively analyzed. Further attention is devoted to estimability in rank deficient models and tests of hypotheses.

The last chapters deal with estimators of parameter vectors, model components, linear functions and dispersion parameters. Beyond the standard model with fixed parameters, the problem of singular design and/or dispersion matrix is thoroughly investigated. A simple numerical example from geodesy is used repeatedly to illustrate the model variants and the influence of singularities and restrictions. This example also serves to show how the different tests work in statistical practice.

I liked the book and I did not like it at the same time. It can be praised for its rigid use of the concept of generalized inverses, projectors and the nice examples. On the other hand, the notation is cumbersome which is especially disturbing in the context of the linear model, the main topic of the book. I also missed treatment of some modern developments like e.g. linear sufficiency, equality of OLSE and BLUE and admissibility. As a consequence, the references are somewhat outdated and limited reflecting merely the authors' own interests. The book is not free of ambiguities and errors, but unfortunately it is not possible to provide the authors with a list since there is no address given in the whole book.

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