

## BOOK REVIEW

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E. GRAFAREND, H. HEISTER, R. KELM, H. KROPFF, B. SCHAFFRIN.

*Optimierung geodätischer Messoperationen.*

499 pages, Hermann Wichmann Verlag, Karlsruhe, 1979.

This book is the first comprehensive monograph on optimization of geodetic measurements. It consists of three parts. Part I (30 pages) gives an introduction to mathematical optimization and its mathematical treatment. The main part (430 pages) is Part II, which is devoted to the optimization of geodetic nets. Here the datum problem (zero-order design), the optimization of configuration (first-order design), the optimization of the observational plan (second-order design), and the optimization of a plan of additional observations (third-order design) are treated. This part is largely based on original work performed by Erik Grafarend and his school. Part III (25 pages) deals with applications of optimization to land consolidation, also based on original work of one of the authors.

Optimization requires advanced mathematical methods, especially of linear algebra. Consequently, the book expects from the reader considerable familiarity with the more advanced aspects of linear algebra (still, the reviewer thinks that less known concepts such as the tensor product used on p. 59 should have been explained when introduced). For the mathematically mature geodesist the book reads very well. The treatment, though compact, is clear and logical, the notation is adequate and transparent, and many examples and diagrams ensure interest and promote understanding. The wealth of material is impressive. A reader, who may sometimes miss patient explanation of details, and the reviewer, who dutifully registers a few minor editorial imperfections, are easily won over by an elegant and colorful style with brilliant sidelights.

This remarkable book is a must for anyone working in the field of geodetic optimization.

Helmut MORITZ