mand language, enabling the user to define new commands in order to perform operations or analyses for which no canned software is available.

The advanced statistical techniques discussed include regression analysis of grouped data, nonlinear regression, analysis of experimental designs, analysis of contingency tables, principal component analysis, principal coordinate analysis, cluster analysis, and time series analysis.

Unfortunately, the book makes a common mistake of most introductions to the use of statistical software: it gives a pseudo-introduction to the statistical technique, instead of providing appropriate references to textbooks and explaining how GENSTAT can be used to do the numerical calculations. Everyone who has seen students "learn" statistics from an SPSS handbook knows what I mean. This is particularly evident in Chapter 5, entitled "The analysis of variation in several variables", where principal component analysis is introduced and illustrated in a way that will be incomprehensible to the novice, and redundant to those who know the basic notions on which the method is based. In contrast, the more technical chapters on how to write programs and procedures in the GENSTAT language appear to be readable and useful.

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1. Peter Lane, Nick Galwey & Norman Alvey, *Genstat 5–An Introduction*, Clarendon Press, Oxford, 1987. {Review **4**, Math. Comp. **52** (1989), 252.}

16[94-01, 94Bxx, 05B05].—VERA PLESS, *Introduction to the Theory of Error-Correcting Codes*, 2nd ed., Wiley, New York, 1989, xiii + 201 pp., $23\frac{1}{2}$ cm. Price $34.95.

This is the second edition of a book which has already secured a prominent place in the textbook literature on algebraic coding theory. The attractive feature of the first edition, namely that of providing a leisurely introduction to the field which is at the same time mathematically rigorous, is again present here. New sections on BCH codes, on Reed-Muller codes, and on the binary Golay code have been added in the second edition, and the bibliography has been updated. There is a certain stress on cyclic codes, and there is ample material on self-dual codes, a subject that is apparently close to the heart of the author. An appendix contains the necessary background in linear algebra. The author manages to convey the beauty and the elegance of the subject, and she writes in an engaging style. The book can be strongly recommended as a course textbook and for self-study. My only criticism concerns the layout which is not optimal: for instance, on pp. 126–127 the statement of Theorem 80 is interrupted by Table 8.1, and

on pp. 160–161 the statement of Theorem 97 is interrupted by Table 9.3.

H. N.

17[62-01, 62J10, 62Kxx, 65Fxx].—RICHARD M. HEIBERGER, *Computation for the Analysis of Designed Experiments*, Wiley Series in Probability and Mathematical Statistics—Applied Probability and Statistics, Wiley, New York, 1989, xv + 683 pp., 24 cm. Price $59.95.

ANOVA (analysis of variance) programs form an important part of statistical software packages. This book discusses in great detail how ANOVA programs are constructed and how their components work. Broader issues in the design of software systems for statistical applications are also treated quite extensively. The book is divided into five parts which cover statistically designed experiments, programming systems, least squares and ANOVA, the interpretation of design specifications, and the analysis of statistically designed experiments.

The treatment of these topics is very much oriented towards application and computation, with little emphasis on the development of the underlying theory. Most concepts are introduced by examples and few words are lost on basic ideas like Latin squares or block designs. An introductory chapter on the theoretical underpinnings would have done no harm. The author gives a lot of useful advice on programming style and on the handling of program systems on the user level. The book contains a generous supply of programs in FORTRAN, BASIC, APL, and C and many worked-out examples illustrating computational procedures. Compilable source codes for all programs are included in a floppy disk, which is packaged with the book and formatted for the IBM PC or compatible computers. For the numerical analyst, the most interesting part of the book is Chapter 11, which describes how techniques of numerical linear algebra such as QR factorizations, Householder reflections, Cholesky factorizations, and LU factorizations can be applied to least squares problems.

The book is eminently suitable as a guide for the practitioner because of its careful expository style and its stress on "hands-on" computations. The mathematical prerequisites are elementary linear algebra and a first course in statistics. Fluency in at least one programming language is assumed.

H. N.

18[11-01, 11A51, 11Y05, 11Y11].—DAVID M. BRESSOUD, *Factorization and Primality Testing*, Undergraduate Texts in Mathematics, Springer, New York, 1989, xiii + 237 pp., 24 cm. Price $45.00.

Is it possible to teach an undergraduate, beginning number theory course by focusing almost entirely on factoring and primality testing? The thought is that these topics use so much number theory that little in a standard course would be left out. This is Bressoud's premise and his book is a text for such