The concluding chapter, Chapter twelve, is devoted to a collection of sparsity issues aside from the solution of sparse linear systems. Notable inclusions in this chapter are the Curtis-Powell-Reid algorithm for efficient calculation of sparse Jacobian estimates and an algorithm of Toint for updating sparse Hessian approximations for quasi-Newton calculations. (Unfortunately, positive definiteness of the approximate Hessian is not retained.) The open question of sparsity-constrained backward error analysis is also discussed.

Direct Methods for Sparse Matrices will be a valuable addition to the bookshelf of every reader interested in the solution of large sparse problems.

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4[62–04].—PETER LANE, NICK GALWAY & NORMAN ALVEY, *Genstat 5—An Introduction*, Clarendon Press, Oxford, 1987, xii+163 pp., $25\frac{1}{4}$ cm. Price $45.00.

GENSTAT is a general statistics program designed to analyze data with the help of a computer. It combines the advantages of a programming language like FORTRAN with those of specialized "canned packages" like SAS or SPSS.

The Genstat 5 introduction by Lane, Galway & Alvey is designed to help the beginner getting started. It covers only the basic features and a few selected statistical methods like plots of data, linear regression, tabulation of data, and analysis of designed experiments. The reader is carefully guided from the first steps of reading and writing data to the actual statistical analyses and to the writing of more complicated Genstat programs. The numerous examples and exercises provide ample opportunity to gain experience with Genstat. I liked particularly the refreshing, nontechnical style in which the book has been written, and I am sure that students will find pleasure in learning to analyze data using this introductory guide. My only criticism of the book is its relatively high price.

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5[62Q05, 62E15, 62F07, 62J15, 62H10].—R. E. ODEH, J. M. DAVENPORT & N. S. PEARSON (Editors), *Selected Tables in Mathematical Statistics*, Vol. 11, Amer. Math. Soc., Providence, R.I., 1988, xi+371 pp., 26 cm. Price $46.00.

This volume includes tables constructed by R. E. Bechhofer and C. W. Dunnett of selected percentage points of the central multivariate Student t distribution in which there is a common variance estimate on ν degrees of freedom in the denominators of the variates, and the numerators either are equicorrelated (Tables A and B) or have a certain block correlation structure (Tables C and D).

Tables A and B (which practically cover the volume) provide in the equicorrelated (ρ) case one-sided and two-sided equicoordinate 80, 90, 95, and 99 percentage

points with 5 decimal place accuracy for p (the number of variates) = 2(1)16(2)20; $\nu = 2(1)30(5)50, 60(20)120, 200, \infty$; $\rho = 0.0(0.1)0.9, 1/(1 + \sqrt{p})$.

The other two tables deal with a block correlation structure with p_1 variates in the first block and p_2 in the second block; the variates in each block have $\rho = 0.5$ and the variates in different blocks have $\rho = 0$. They provide one-sided 80, 90, and 95 percentage points with 5 decimal place accuracy for $p_1 = 1(1)4$; $p_2 = p_1(1)6, 9$; $\nu = 5(1)30(5)50, 60(20)120, 200, \infty$. Table C gives equicoordinate percentage points, while Table D gives percentage points of a particular form which is not equicoordinate unless $p_1 = p_2$.

These tables have many statistical applications. They are typically needed in procedures devised for selection among normal means, using either the indifference-zone or subset approach, and for multiple comparisons involving contrasts among means. These and other applications are described in detail. Examples are given illustrating applications of the tables.

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6[65–04].—WILLIAM H. PRESS, BRIAN P. FLANNERY, SAUL A. TEUKOLSKY & WILLIAM T. VETTERLING, *Numerical Recipes in C—The Art of Scientific Computing*, Cambridge Univ. Press, Cambridge, 1988, xxii+735 pp., 24 cm. Price $44.50.

This is an edition in the C computer language of the original FORTRAN and Pascal version of [1]. A subsection has been added discussing some of the C conventions for scientific computing. Also, errors in the original volume that have come to the authors' attention have been corrected in this edition.

W. G.

1. WILLIAM H. PRESS, BRIAN P. FLANNERY, SAUL A. TEUKOLSKY & WILLIAM T. VETTERLING, *Numerical Recipes—The Art of Scientific Computing*, Cambridge Univ. Press, Cambridge, 1986. (Review **3**, *Math. Comp.*, v. 50, 1988, pp. 346–348.)

7[65–04].—WILLIAM T. VETTERLING, SAUL A. TEUKOLSKY, WILLIAM H. PRESS & BRIAN P. FLANNERY, *Numerical Recipes Example Book* (C), Cambridge Univ. Press, Cambridge, 1988, ix+239 pp., $23\frac{1}{2}$ cm. Price $19.95.

This is an edition in the C computer language of the original FORTRAN and Pascal versions [1].

W. G.

1. WILLIAM T. VETTERLING, SAUL A. TEUKOLSKY, WILLIAM H. PRESS & BRIAN P. FLANNERY, *Numerical Recipes Example Book* (*FORTRAN*); *Numerical Recipes Example Book* (*Pascal*), Cambridge Univ. Press, Cambridge, 1985. (Review **4**, *Math. Comp.*, v. 50, 1988, pp. 348–349.)