comings of frozen-coefficient stability analysis can be ascribed to a defect in the definition of stability, and that there do not exist exact analyses of nonlinear problems.

He distinguishes between his field of Computational Fluid Dynamics, and a broader field, Numerical Fluid Dynamics, which is not included in the book, and which presumably contains high accuracy methods as well as the appropriate analysis.

Even the subjects included are treated in an inadequate and slipshod manner. A few examples: the author is enthusiastic about upstream (first order!) differencing, although he quotes, without comment, another author who called it unacceptable. He quotes, approvingly, results obtained with this method at a Reynolds number $R = 10^6$. As his own paper at the end of the book shows, the numerical diffusion in such a scheme is of the order of the mesh size; the contradiction is never resolved.

The discussion of boundary conditions for the pressure in the incompressible (V, p) equations is misleading. The author does indicate some of the disasters which may ensue from the application of his rules, and then merely gives a recipe for keeping the pressure bounded in a specific case, although the general theory is well known. He also states flatly and erroneously that there are no implicit (V, p) formulations available.

Higher order methods for the gas dynamics equations are dismissed because the solutions are not smooth; this would, of course, be a reason for advocating such methods, as an inspection of the Fourier-space characterization of accuracy would reveal. Richardson extrapolation is also dismissed, even for viscous flow.

In summary, this long book is not only inadequate, but also pernicious. It fosters the attitude that accuracy and analysis are the realm of effete "numerical" fluid dynamicists and not useful to practical people. If taken seriously, this book may delay the maturation of its subject.

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54 [8].—CHARLES E. LAND, *Tables of Standard Confidence Limits for Linear Functions of the Normal Mean and Variance*, Department of Statistics, Atomic Bomb Casualty Commission, Hiroshima, Japan 730. Ms. of 6 pp. + 65 computer sheets (reduced) deposited in the UMT file.

The tabulated values of $C(s; \nu, \alpha)$, $C_{-1}(s; \nu, \alpha)$, and $C_{+1}(s; \nu, \alpha)$ represent scaled level α confidence limits for $\mu + \lambda\sigma^2$, for arbitrary nonzero λ, where μ and σ^2 are, respectively, the unknown mean and variance of a normal distribution. These limits correspond to observed values of (Y, S), where $Y \sim N(\mu, \sigma^2/\gamma^2)$, γ is a known positive number, and S^2 is distributed independently as σ^2/ν times a chi-square variate with ν degrees of freedom. For a given observed value (y, s), the level α one-sided upper confidence limit for $\mu + \lambda\sigma^2$ is $y + \delta\beta s\{\nu^{-1/2}C(\beta s; \nu, \alpha^*) + \beta s/2\}$, where $\delta = (\nu + 1)/(2\lambda\gamma^2)$, $\beta = 2|\lambda|\gamma/(\nu + 1)^{1/2}$, and $\alpha^* = \alpha$ or $1 - \alpha$ according as λ is positive or negative. Similarly, the corresponding lower and upper two-sided limits are $y + \delta\beta s\{\nu^{-1/2}C_{\mp\,\mathrm{sgn}(\lambda)}(\beta s; \nu, \alpha) + \beta s/2\}$.

One-sided standard limits $C(s; \nu, \alpha)$ are given to 3D in Table 1 for $s = 0.1(0.1)1(0.25)2(0.5)10$, $\nu = 2(1)30(5)50(10)100(20)200(50)500(100)1000$, and α (and $1 - \alpha$) = 0.0025, 0.005, 0.01, 0.025, 0.05, 0.1, 0.25, 0.5. Two-sided standard limits $C_{\mp}(s; \nu, \alpha)$ are presented (also to 3D) in pairs in Table 2 for the same range of s, and for $\nu = 2(2)20$, $\alpha = 0.5, 0.8, 0.9, 0.95, 0.98, 0.99, 0.995$. The author recommends quadratic or cubic interpolation on s and ν to obtain intermediate values from these tables.

The present tabular entries were calculated with the aid of extensive tables of critical values [1] by the same author. Abridged versions of the tables under review, together with a discussion of their evolution and construction, have been published by the author [2].

J. W. W.

1. CHARLES E. LAND, *Tables of Critical Values for Testing Hypotheses about Linear Functions of the Normal Mean and Variance* II, ms. deposited in the UMT file. (See RMT 42, *Math. Comp.*, v. 28, 1974, p. 887.)

2. CHARLES E. LAND, "Standard confidence limits for linear functions of the normal mean and variance," *J. Amer. Statist. Assoc.*, v. 68, 1973, pp. 960–963.

55 [12].—DONALD E. KNUTH, *The Art of Computer Programming*, Vol. 3: *Sorting and Searching*, Addison-Wesley Publishing Co., Reading, Mass., 1973, xi + 722 pp. Price $19.50.

One of the more important events to occur in the field of computers and information sciences has been the appearance of the first three volumes of *The Art of Computer Programming* by Donald E. Knuth. In all, a total of seven volumes are to be published, comprising twelve chapters. Volume 1 presents basic material in discrete mathematics, basic programming concepts via a hypothetical computer (MIX), and fundamental algorithms for the manipulation of data structures (see *Math. Comp.*, v. 23, 1969, pp. 447–450, RMT 18). Volume 2 is concerned with random number generation and with approximate and exact computer arithmetic and topics in computer algebra (see *Math. Comp.*, v. 24, 1970, pp. 479–482, RMT 26). Volume 3, the subject of this review, treats the fundamental algorithms for sorting and searching. Volume 4 will deal with combinatorial algorithms, Volume 5 with syntactic algorithms, Volume 6 with mathematical linguistics, and finally Volume 7 with compilers.

Prior to the appearance of the first volume, authorship of a series of books of such scope and magnitude by a single person was the object of reasonable skepticism.