22[F, K, X, Z].—BIRGER JANSSON, *Random Number Generators*, Almqvist and Wiksell, Stockholm, 1966, 205 pp., 24 cm. Price Sw. kr. 42.

The most commonly used method of generating pseudo-random numbers with a digital computer is the congruential method. In this method, which was introduced by D. H. Lehmer in 1951, one begins with a number x_1 between 0 and 1, and the next number x_2 is computed as the fractional part of $Nx_1 + \theta$, where N is an integer > 1 and $0 \leqq \theta < 1$. Now x_3 is computed as the fractional part of $Nx_2 + \theta$, etc. The congruential method has been analyzed by many authors. In Chapters 5 and 6 of Birger Jansson's book, he presents a profound study of this method. One wishes to know the serial correlation of such a sequence. If x_1 and θ are rational, as they must be in digital computation, the determination of the serial correlation is a problem in number theory. Beginning with results of Dedekind, Rademacher, and Whiteman, Jansson obtains a practical algorithm for computing the correlation, and he presents extensive tables of exact values of the correlation. This achievement alone will make Jansson's book an indispensable reference in the continuing study of deterministic methods by which we seek to simulate random processes.

The book contains many other topics. There is a survey of statistical tests which have been applied to pseudo-random numbers. There is a collection of special algorithms for computing pseudo-random numbers belonging to distributions other than the uniform distribution. And there is a brief review of the existing theory of what we should *mean* when we call a perfectly well-determined sequence "random."

There is little mention of the *algebraic* theories of random numbers. There is a reference to Zierler's work, but there is no mention of the beautiful and important work of Golomb, Tausworthe, and others on the *P-N* sequences which are used in digital tele-communications. The application of the theory of Galois fields to finite pseudo-random binary sequences has received too little attention by analysts. This theory is particularly challenging because it involves concepts of randomness different from those used in analytical studies.

In summary, Jansson's book is excellent. It is the newest and the most complete guide to the analytical theory of pseudo-random numbers.

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23[G, S].—SHIGETOSHI KATSURA, *Tables of Representations of Permutation Groups for the Many Electron Problem*, Department of Chemistry, University of Oregon, Eugene, Oregon, 1962, unbound report of 326 pp., 28 cm. One copy deposited as Document No. 7567 with the ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington, D. C. Photoprint \$42.00; microfilm copy \$14.55 (payable in advance to Chief, Photoduplication Service, Library of Congress).

These tables give to 8D (with a purported maximum error of 5 units in the final decimal places) the elements of those matrices of irreducible unitary representations of the symmetric group on N letters (which are the associates of the representations corresponding to two-element partitions $[(N/2) + S, (N/2) - S]$ of N). These tabulated elements correspond to the elements (pN), for $p = 1(1)N - 1$, of the transposition class of S_N, for $N = 2(1)9$. The dimension of such a representation is the quotient of $(2S + 1)(N!)$ by $[(N/2) + S + 1]![(N/2) - S]!$. When N is as large as 9 this number can be quite large; for example, the dimension of the representation corresponding to $N = 9$, $S = \frac{3}{2}$ is 48, so that the corresponding matrices involve 2304 elements. Since the square of a transposition is the identity permutation, the matrices corresponding to a transposition are symmetric, and it seems uselessly lavish to ignore this fact in printing the tables.

The underlying calculations were performed on an IBM 1620 in the Statistical Laboratory and Computing Center at the University of Oregon and on an IBM 709 in the Pacific Northwest Research Computer Laboratory at the University of Washington.

Following an introductory description of the theory of molecular structure using representation matrices and a discussion of the construction of such matrices, the author appends a list of errata in the smaller tables of Yamanouchi [1], Inui & Yanagawa [2], and Hamermesh [3]. Also included is a list of 11 references.

A brief description of these tables has been published by the author [4].

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1. T. YAMANOUCHI, *Proc. Phys.-Math. Soc. Japan*, v. 18, 1936, p. 623.
2. T. INUI & S. YANAGAWA, *Representation of Groups and Quantum Mechanics of Atoms and Molecules*, 2nd ed., Shohkabo, Tokyo, 1955.
3. M. HAMERMESH, *Group Theory and its Application to Physical Problems*, Addison-Wesley, Reading, Mass., 1962.
4. S. KATSURA, "Tables of representations of permutation groups for molecular integrals," *J. Chem. Phys.*, v. 38, 1963, p. 3033.

24[I].—D. S. MITRINOVIĆ & R. S. MITRINOVIĆ, *Tableaux d'une classe de nombres reliés aux nombres de Stirling*, VI., Belgrade, Mat. Inst., Posebna izdanja, Knjiga 6 (Editions spéciales, 6), 1966, 52pp., 24 cm.

The tables of ${}^{r}S_n^{\,k}$ for $n = 3(1)36$, reviewed in *Math. Comp.*, v. 19, 1965, pp. 151, 690, are here extended, in the same style, to the cases $n = 37$ and 38.

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25[I, L].—HENRY E. FETTIS & JAMES C. CASLIN, *Ten Place Tables of the Jacobian Elliptic Functions*, Report ARL 65–180 Part 1, Aerospace Research Laboratories, Office of Aerospace Research, United States Air Force, Wright-Patterson Air Force Base, Ohio, September 1965, iv + 562 pp., 28 cm. Copies obtainable upon request from the Defense Documentation Center, Cameron Station, Alexandria, Virginia.

This report contains 10D tables of the Jacobi elliptic functions $am(u, k)$, $sn(u, k)$, $cn(u, k)$, and $dn(u, k)$, as well as the elliptic integral $E(am(u), k)$ for $k^2 = 0(0.01)0.99$, $u = 0(0.01)K(k)$ and for $k^2 = 1$, $u = 0(0.01)3.69$. Here, as is