Scandinavica, Mathematics and Computing Machinery Series, No. 8, Copenhagen, 1963, 73 p., 25 cm. Price Sw. Kr. 10.00.

Let $f(x)$ be given graphically on the closed interval $(0, 2\pi)$. Required are the Fourier coefficients; for example, a_n, where $f(x) = \sum_{n=0}^{N} a_n \cos nx$, and $a_n = (\frac{1}{2}n) \sum_{s=1}^{2n} f(x_s) \cos(s\pi/n)$. The idea is to have a set of rulers so graduated as to facilitate location of x_k.

There is a discussion of the relation between a_n and $A_n = (1/n\pi) \int_0^{2\pi} f(x) \cos nx \, dx$.

Y. L. L.

57[X].—G. E. Uhlenbeck & G. W. Ford, "The theory of linear graphs with applications to the theory of the virial development of the properties of gases", Appendices 2, 3, 4, Le Boer & Uhlenbeck, editors, *Studies in Statistical Mechanics, Volume I*, North-Holland Publishing Company, Amsterdam, 1962, p. 199–211.

Three tables concerning graphs are given in the appendices of the monograph above.

For $p = 4(1)7$ and $k = 0(1)\frac{1}{2}p(p - 1)$, Appendix 2 lists the number of graphs with p points and k lines of the following six types: $N_{p,k}$ = labeled graphs; $C_{p,k}$ = labeled connected graphs; $S_{p,k}$ = labeled stars; $\pi_{p,k}$ = free graphs; $\gamma_{p,k}$ = free connected graphs; and $\sigma_{p,k}$ = free stars.

The interesting Appendix 3 shows diagrams of each topologically distinct connected graph for $p = 2(1)6$ and $k = p - 1\ (1)\frac{1}{2}p(p - 1)$. For each of these there is given n, the number of such graphs if they were labeled; d, the so-called "complexity" (an invariant of the graph matrix); and finally a symbolic designation of the corresponding graph group. For p and k fixed the number of topologically distinct graphs is the quantity $\gamma_{p,k}$ above, while the sum of the corresponding values of n is the quantity $C_{p,k}$ above. (There is an error in the first graph for $p, k = 6, 7$; the leftmost vertical line should be deleted).

Appendix 4 lists $n(p, k, d)$ for $p = 2(1)7$, $k = p - 1\ (1)\frac{1}{2}p(p - 1)$ and all pertinent values of d. This is obtained by adding the values of n for all graphs with the same values of p, k, and d.

Besides the physical application indicated in the title, the monograph contains a certain amount of graph theory, defining the above concepts and quantities and giving formulas. On page 197 is an unproved conjecture concerning the asymptotic behavior of $n(p, k, d)$.

D. S.

58[X].—J. G. Herriot, *Methods of Mathematical Analysis and Computation*, John Wiley & Sons, New York, 1963, xiii + 198 p., 24 cm. Price $7.95.

This is the first volume in a series on spacecraft structures, and is intended to present the mathematical methods that are most useful to structural engineers. The emphasis is on numerical methods, and the contents run over a small gamut of topics from interpolation to partial differential equations. The exposition is simple, and, since the author avoids involvement with knotty questions, the material should be comprehensible and useful to anyone with a few years of college mathematics.

P. J. D.

59[X].—B. R. SETH (executive editor), *Proceedings of the Seventh Congress on Theoretical and Applied Mechanics*, Indian Society of Theoretical and Applied Mechanics, Kharagpur, India, 1961, xi + 379 p., 25 cm.

Of the papers presented, that which offers the main interest for computation is "Monotonic operating in numerical mathematics," by L. Collatz, a survey of part of the recent work done by the author and his school, and published mainly in the *Archive for Rational Mechanics and Analysis* and in *Numerische Mathematik*.

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60[Z].—FRITZ RUDOLF GÜNTSCH, *Programmierung digitaler Rechenautomaten*, Walter de Gruyter & Co., Berlin, 1963, 392 p., 24 cm. Price $13.00.

According to the introduction, this second edition represents a completely changed and substantially expanded version of the work; and, without question, this is indeed a rather modern introduction to the programming field.

A striking feature of this book is the complete parallelism of presenting the entire material in a symbolic machine-oriented language and at the same time in an algorithmic language. Throughout its entire design and terminology the presentation in algorithmic notation has been directed completely and consistently toward ALGOL, and accordingly the book is in part an elementary introduction to ALGOL-60. The symbolic programming is based on the Zuse Z-22. The Z-22, a widely used computer in German universities, has a 2^{12}, 38-bit word drum memory with 5 ms mean access time and a 16-word core memory, which is in part used as accumulator and for various registers. The symbolic notation employed is based on the Freiburger Code, an assembly language developed at the University of Freiburg/Br.

Chapter 1 provides an introduction to flow charts and programming in general, after which it presents a brief description of the Z-22. The second chapter gives a concise definition of the Z-22 order code and a convention for flow chart notations. Chapter 3, the longest chapter in the book, enters into a detailed discussion of simple programs, including the concept of a loop; at the same time the fundamentals of ALGOL are introduced (although the name ALGOL is not yet mentioned). This is followed by a short Chapter 4 on symbolic addressing, while Chapter 5 deals with programs with multiply nested loops. Chapter 6 then discusses the different ways of supplying a subroutine with parameters and includes a very good, brief discussion of recursive subroutines. Chapter 7 contains a systematic presentation of address changes, relocation of programs, indexing and related topics. Chapter 8 introduces the succeeding chapters by discussing briefly the differences between interpretive routines and assembly programs, etc. Chapter 9 then furnishes a presentation of the actual machine language of the Z-22 and of some of the principles of assembly programs as, for example, address assignment and subroutine calls. Chapter 10 concerns itself with compiler languages and with some aspects of