most-periodic solutions of ordinary differential equations. It contains concise expositions of the method of averaging, the method of successive approximations, and a treatment of singular perturbations. Chapter IV, by far the longest, takes up the questions of the previous chapters in the setting of functional-differential equations. Stability theory is developed in terms of Lyapunov functionals, the stability of a regulator system with time lag is discussed by the method of Popov, criteria for the existence of periodic solutions are given, and an extension of the method of averaging is introduced in detail.

Each chapter is provided at the end with some brief notes containing references to the origin of some of the theorems and to further work. The book closes with a fairly complete bibliography up to 1964.

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44[P, X, Z].—B. A. Volynskiĭ & V. Ye. Bukhman, *Analogues for the Solution of Boundary-Value Problems*, International Tracts in Computer Science and Technology, and their Application, Volume 13, Pergamon Press, New York, 1965, xi + 460 pp., 24 cm. Price $15.00.

The primary aim of the authors is to describe the development of network analyzers in the Soviet Union for the approximate solution of boundary-value problems in partial differential equations. To this end, the book is divided essentially into two parts.

First, representative scientific and engineering problems which lead to boundary-value problems are introduced, and finite-difference, integral and Monte Carlo methods for their solution are investigated. The construction of electrical circuits corresponding to the approximate expressions for the solutions of the mathematical equations are presented for numerous cases. The Dirichlet, Neumann and mixed-boundary value problems are covered. The treatment is well-organized and lucid, with particular emphasis placed on the nature of errors in the solutions and on methods for improving accuracy. This should prove of great value to the engineer who seeks a practical, clearly written approach to the subject.

The second portion of the book is concerned with general-purpose and special-purpose network analyzers. The former are applied to equations of the Laplace, Poisson and Fourier type; the latter are invoked when there are more stringent requirements, e.g., greater number of nodes, improved accuracy, greater speed of solution. There is a detailed discussion of the construction of these analyzers and of techniques for measuring the physical quantities which yield the solutions.

One subject which receives special attention is the use of a "star" configuration of resistors to represent the integral form of solution of boundary-value problems for unbounded domains. This English edition contains a supplementary chapter which reviews the research, carried out after the book appeared in the Soviet Union in 1960, on the simulation of integral methods and of more complicated boundary conditions. A few hybrid applications are also included.

The material in this second part of the book is highly specialized; much of it

is the result of extensive analyses carried out by the authors and others. Devoted, as it is, primarily to special-purpose network analyzers, its audience is a somewhat limited one. Nonetheless, the authors are to be commended for their contributions to a complex subject, and for their constant attention to the theoretical as well as to the practical aspects of their analogues.

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45[P, Z].—HELLMUT GOLDE, *Fortran* II *and* IV *for Engineers and Scientists*, The Macmillan Company, New York, 1966, xvi + 224 pp., 28 cm. Price $4.50.

"Primarily a text for beginning students in engineering and science on the college level," this book represents, with a few exceptions, a complete treatment of the subject matter in a clear and lucid style. After the usual introductory material, the elements of the FORTRAN language are presented in Chapters 3–9. The dialect is that of level one of the proposed American Standard for FORTRAN. The FORTRAN IV extension is discussed in Chapter 10. A presentation of the elements of the language is motivated by means of one or more coding problem(s) in each chapter. Examples of correct and incorrect coding are given throughout the text. Basic numerical problems associated with fixed precision floating point quantities and the necessary programming to avoid these difficulties are also discussed. Complete statistics are available concerned with the characteristics of the compilers for various computers (appendices A and B).

Although the overall treatment of the subject matter is good, there are a few weaknesses. Scanty material is presented on the generation and review of binary information stored peripherally, an important aspect of many large scientific problems. A discussion of the computed GØ TØ statement and EQUIVALENCE statement is left for the concluding Chapter 11. Thus, the frequent use of these statements, which occurs in everyday situations, is not reflected in the coding problems of the text. A glossary of terms is not included.

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46[S].—B. L. MOISEIWITSCH, *Variational Principles*, John Wiley & Sons, New York, 1966, x + 310 pp., 24 cm. Price $14.00.

Variational principles have long played two major roles in mathematical physics; one as great unifying principles through which the different equations can be expressed in elegantly simple form, and the other as remarkably useful computational tools for the accurate determination of discrete eigenvalues such as the vibration frequencies of classical systems and the bound state energies of quantum mechanical systems. In the latter role, variational principles represent a small triumph of man over nature. The fractional error in the quantity to be determined, the "output," is proportional to the square of the fractional error in the "input" information,