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EDITOR'S NOTE: The author has notified us that he has recomputed the tables over certain ranges of the variable in multiple precision and has found numerous last-place errors on pages 3 and 4 of $x = .0010$ to $.0100$. An Errata sheet has been prepared and is available on request.

54[M].—L. S. PONTRYAGIN, *Ordinary Differential Equations*, Addison-Wesley Publishing Company, Inc., Reading, Massachusetts, 1962, vi + 298 p., 23 cm. Price $7.50.

From the publisher's preface: "This book constitutes a mildly radical departure from the usual one-semester first course in differential equations."

From the author's preface: "The most important and interesting applications of ordinary differential equations to engineering are found in the theory of oscillations and in the theory of automatic control. These applications were chosen to serve as guides in the selection of material."

One could attempt to characterize Pontryagin's "mildly radical departure" as a combination of more modern theory and more realistic application. There is a long chapter on stability theory, Lyapunov's theorem, limit cycles, and periodic solutions. While an earlier and even longer chapter has a title that is "classical" enough, namely, "Linear Equations with Constant Coefficients," the strong geometric emphasis, and the many diagrams of phase trajectories, nodes, saddle points, etc., are again distinctly modern in character.

It seems likely that the book will not only be successful in itself, but will also markedly influence the content of future textbooks. Although American authors are unlikely to put quite as much stress on Vyshnegradskiy's theory of the centrifugal governor and Andronov's analysis of the vacuum-tube oscillator, the approach used here will probably be widely followed.

Educational prognostications aside, the book can be recommended to those who learned differential equations the "old way" and who wish an introduction to newer technique and content. The book is interesting, and individual in style. Who but Pontryagin would combine "The breakdown in performance of governors in the middle of the 19th century is explained by the fact that, due to the development of engineering, all four quantities appearing in (15) were subjected to changes which served to diminish the stability" (page 220) with "Such cases can be easily imagined; for example, N can be the perfect set of Cantor" (page 233)?

There is a supplementary chapter on relevant matrix theory. There are no exercises.

D. S.

55[M, X].—ATHANASIOS PAPOULIS, *The Fourier Integral and its Applications*, McGraw-Hill Book Company, Inc., New York, 1962, ix + 318 p., 23 cm. Price $10.75.

This book treats what has long been known as operational calculus from the point of view of the Fourier integral theorem and the Fourier transform rather than from the point of view of the Laplace transform. The book consists of three parts and two appendices. In the first part, in addition to the Fourier integral theorem, the convolution theorem, Parseval's formula etc., an elementary dis-

cussion of "singularity functions" (the δ-function and its derivatives) is given and the Poisson sum formula is derived. The last chapter of the first part treats numerical techniques and the uncertainty principle which states a relationship between a function and its Fourier transform. The second part of the book treats linear systems, low-pass and bandpass filters and spectrum analyzers. The third part shows the connection between the Laplace and Fourier transforms and discusses Hilbert and Wiener-Lee transforms. The last part treats positive functions and limit theorems, generalized harmonic analysis, correlation, and power spectra. Each part is followed by a collection of about twelve problems, to many of which the solutions are given. The first appendix treats the δ-function as a distribution function, and the second gives a summary account of the theory of analytic functions, ending with an account of the saddle-point method.

The book contains a great amount of useful information and is written in a readable, lively manner. The level of mathematical sophistication is lower than we like to see, the order of integration in a repeated infinite integral, for example, being cheerfully inverted without any mention of the restrictions this places upon the integrand. Doubtless the author feels that these matters properly belong to a parallel class in advanced calculus. If students of the book cover these finer points in such a class, or by private study, they should find the book very informing and rewarding.

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56[T, Z].—Donald N. Hanson, John H. Duffin, & Graham F. Somerville, *Computation of Multistage Separation Processes*, Rheinhold Publishing Corp., New York, 1962, viii + 361 p., 22 cm. Price $8.75.

In this book the authors present a discussion of the mathematics of multistage separation processes with application to vapor-liquid systems and liquid-liquid extraction. A large part of the book is devoted to a series of computer programs (written in Fortran) to solve a wide range of separation problems, including multiple-feed and multiple-product processes in distillation, absorption, stripping, and extraction. The authors state that the programs have been extensively checked in typical chemical engineering problems.

The general presentation of the mathematical background material seems to be very concise and clear. The description of the various computer programs is very good, although an acquaintance with Fortran would be very desirable for anyone actually planning to use the routines. It should be noted that most of the programs would have to be somewhat modified to run under the monitor systems used in most IBM-7090 computer installations. The changes necessary would be mostly in the read-write statements and in the avoidance of the use of sense switches.

In general, the book should prove to be a valuable contribution to the literature of separation processes, both as a textbook for an advanced course and as part of the working library of engineers concerned with problems in this area.

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