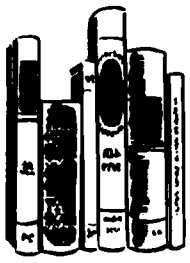

books reviewed

Operational Mathematics (2nd Ed.)

By Ruel V. Churchill. Published (1958) by McGraw-Hill Book Co., 330 W. 42 St., New York 36. ix + 337 pp. 6 by 9 in., Price $7.00.

This second edition, published under a new title, is an extensive revision of *Modern Operational Mathematics in Engineering*, published in 1944. It covers the properties and applications of the Laplace Transformation, the Fourier Transformation, and Eigenvalue problems, and, as the author states, is intended for use as the text for a basic course in operational methods at the junior or senior level and for an advanced course covering methods in partial differential equations.

The greatest part of the book, seven chapters out of ten, is given over to an extensive treatment of the properties and varied applications of the Laplace transformation. The mathematical development requires a background which includes advanced calculus, although several topics in advanced calculus are reviewed to provide the necessary background. There is also a chapter devoted to a review of complex variable theory which is necessary in extending the Laplace Transformation to complex numbers and in the material on Fourier transforms and Eigenvalue problems.

The applications discussed in the book require some knowledge of such topics as heat transfer, electrical circuit theory, and mechanics. The reader who has had at least a year of college physics, or the equivalent experience in practical engineering problems, should have little trouble in understanding the applications and interpreting the results. Although the important results are stated as theorems and are rigorously proved, those who are primarily interested in the engineering and physical applications will be able to appropriate the results of the theorems and spend little or no time on the mathematical proofs and derivations. Care should be taken in doing this, since in many cases it is necessary to understand thoroughly the conditions under which the results are reliable.

The comparatively advanced background required by this text is a severe limitation on its usage. Engineers who have the required background will find the book of considerable interest. The applications to the design of mathematical systems should be of interest to those concerned with design and analysis of such systems, and electrical engineers will find many applications to circuit analysis and servomechanism theory. Many other applications not specifically called out will also be readily apparent, and operational methods often provide a simplified means to problem solution.

The excellent bibliography found at the end of the book provides further references for those who are interested in a more detailed treatment of specific applications, and an extensive table of the common Laplace transforms is also included in the appendices.

In summary, this text should prove useful and interesting as a reference for those who are concerned with the design and analysis of electrical and mechanical systems. It is of extremely limited value to those who do not have at least a working knowledge of such systems and the necessary mathematical background.—*Harvey W. Mertz*, Philco Corp., 22 St. and Lehigh Ave., Philadelphia 32.

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