28 [7].—IRWIN ROMAN, *Tables of* $N^{3/2}$, ms. of 68 pp., $8\frac{1}{2}'' \times 11''$, deposited in the UMT file.

In *MTAC*, v. 1, 1945, p. 407, QR **14** Dr. Roman briefly described his manuscript tables of $N^{3/2}$. Subsequently he enlarged them, so that the copy deposited in the UMT file now consists of 10S values corresponding to $N = 0(1)9999$. He has included a single page of 9D values for $N = 1.0001(.0001)1.0099$, which appeared in his earlier version.

A successful comparison of this table has been made by this reviewer with the similar, less extensive 10D tables of Davis & Fisher [1].

J. W. W.

1. H. T. DAVIS & V.J. FISHER, *Tables of the Mathematical Functions*, Vol. III, The Principia Press of Trinity University, San Antonio, Tex., 1962, pp. 506–507. MR 26 #364. (See *Math. Comp.*, v. 17, 1963, pp. 459–461, RMT 68.)

29 [7].—E. ORAN BRIGHAM, *The Fast Fourier Transform*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1974, xiii + 252 pp., 24 cm. Price $19.95.

When the fast Fourier transform (FFT) algorithm was rediscovered and published by Cooley and Tukey, it came to the attention of a number of people who had an urgent need for it. Subsequently, a great many papers on applications and extensions of the basic idea were published. This fast algorithm led to increased applications of Fourier theory to digital processes. Consequently, the theory of the discrete Fourier transform (DFT) which had received relatively little attention in the literature, became a subject of great interest to applied mathematicians and engineers.

The present book gives a detailed description of the DFT and its relation to the Fourier theory of continuous functions in a form suitable for engineering students. It starts at a very elementary level, discussing basic Fourier transform theory and the DFT in great detail, with many graphs and diagrams, in a not too rigorous heuristic manner.

The essentials of the FFT algorithm can be given in a few pages. However, for pedagogical reasons, 49 pages are taken up with long algebraic derivations describing various forms of the algorithm along with system flowgraphs for each. This does achieve its purpose, i.e., completeness. However, it may take some perseverance to go through the algebraic manipulations. The elementary level of this treatment may be appealing to an engineer first encountering the subject. However, such a person is probably not ready to concern himself with the details of the FFT algorithm. On the other hand, the working scientist or engineer who has a need for the increased speeds available from the FFT algorithm, and who wants to make a detailed study of it, will find this too elementary. The part of the book dealing with the FFT algorithm takes only one-third of the book and is introduced by treating the 4-point form of the algorithm algebraically and with system flowgraphs. This simple treatment suffices to introduce the reader to flowcharts and programs and will be appreciated by the engineering student. Special algorithms for two real transforms via one complex transform and for one real transform are derived. Then the book gives derivations of the more general algorithms in several different forms and for the mixed-radix case.

Some essential parts of the explanation of the FFT algorithm are somewhat inadequate. For example, the explanation of the reasons for the economy of the method uses the case $N = 4$, showing that the FFT takes fewer operations. However, this is due to the fact that some powers of W_N are equal to one, which does not affect the asymptotic behavior of the operations count. In fact, the discussion does not lead to the general asymptotic formulas given. In the more general FFT algorithms, the algebraic manipulations obscure the basic simplicity of the FFT algorithm, particularly for students at the level for which the rest of the book is designed.

The chapter on convolution calculations is effectively given at the same level as the first part of the book. It is strange that no mention is made of applications of the methods to engineering problems.

Aside from the fact mentioned above, that it is hard to define the type of student for whom the book is really designed, it can be a good text book for engineering students at a fairly elementary level. However, the teacher would have to condense and abstract the essential parts of the algorithm from the chapters on the FFT algorithm, since an elementary student would not really have much need or use for the detail given here.

For the working scientist or engineer, however, who merely wants to learn to use the FFT algorithm, it may be more efficient to consult a few of the references on the subject.

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30 [7].—K. A. STROUD, *Laplace Transforms, Programmes and Solutions*, John Wiley and Sons, New York, 1973, x + 275 pp., 23 cm. Price $5.75 (paperbound).

The reviewer can do no better than to quote from the author's preface. "The purpose of this book is to provide a sound introductory course in the use of Laplace transforms in the solution of differential equations and in their application to technological situations. The course requires no previous experience of the subject, but some knowledge of the solution of simple differential equations by the classical methods is assumed. The book forms a topic module. It approaches the subject in a practical way and has been devised specifically for courses leading to (i) B. Sc. Degree in engineering and science subjects, (ii) Higher National Diploma and Higher National Certificate in technological subjects and courses of a comparable standard. The module is self-contained and can therefore be introduced into any appropriate year of such courses and by its nature is equally applicable for individual or class use. The text has been based on self-learning methods developed and extensively tested over the past ten years. In controlled post-tests, each of the programmes has consistently attained a success rating in excess of 80/80, i.e., after working through each programme at least 80 per cent of the students scored at least 80 per cent of the possible marks. The individual nature of the method, the ability of a student to progress at his own rate, the immediate assessment of responses and, above all, the complete involvement of the student, all result in high motivation and contribute significantly to effective learning."

The volume is divided into eight programs. Programs 1–4 develop use of the transforms to solve various types of differential equations. Programs 5–8 deal with the Heaviside unit step function, periodic functions and the impulse function. A set of worked examples provides an introduction to the application of transforms to engineering problems, and a concluding section includes a table of transforms and inverse transforms.

It appears that the volume is well suited for self-study. But the very nature of