

little more general interest (to those concerned with atmospheric transmission, for example) because of the neglect of the effects of turbulence and of multiple scattering in general, possibly permissible for water but certainly not neglectable for atmospheric sound transmission.

Analytical Transients. By T. C. Gordon Wagner. 202 pp. John Wiley and Sons, Inc., New York, 1959. \$8.75. Reviewed by Peter L. Balise, University of Washington.

MUCH information has been compressed into this graduate electrical engineering text, which deals with network analysis, Fourier series, and the Laplace transformation. Professor Wagner combines directness and rigor in his analyses and brings a fresh approach to some topics, so that the acute student will delight in the treatment, but it will be difficult for the reader with less perception or background. A sound mathematical basis is emphasized, rather than details of technique, although there are adequate illustrative examples.

The various methods of network analysis are discussed, with a good coverage of dual electrical networks and analogous mechanical systems, using Lagrange's equations. Considerable attention is given to the initial form of the transient and its derivatives under continuous and discontinuous inputs.

About half the book is devoted to Fourier analysis and related topics. Although it is stated that only an elementary acquaintance with Fourier series and the Laplace transform is assumed, the student would be best prepared with an understanding of orthogonality, an essential feature of the Fourier series which is too often neglected. Professor Wagner approaches the Fourier series as a least squares approximation, followed by the question of its convergence and then logically leading into the Fourier integral and the Laplace transform. While this sequence is standard, Professor Wagner shows some of the relationships especially well; on the other hand, he does not include the illustrations and explanations that are helpful to the beginner in this area. There is an interesting presentation of sampling theorems, showing the relation between discrete and continuous spectra, and an excellent explanation of Gibbs' phenomenon.

A chapter on stability considers the theorems of Sturm, Cauchy (or Nyquist), and Routh. The approach is rigorous, without the common simplifying assumptions.

In forty pages there are presented most of the useful properties of the Laplace transformation, including time delay, recurrence relations, convolution, and the application to partial differential equations, as well as an explanation of complex variable theory from elementary definitions to contour integration. Of course many aspects are omitted, but the treatment is surprisingly complete and often outstandingly lucid.

In summary, the book is a concise exposition which many readers will wish were longer.

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