DISTRIBUTIONS AND THE BOUNDARY VALUES OF ANALYTIC FUNCTIONS, by Edward J. Beltrami and M. Ronald Wohlers. 116 pages, diagrams, illustr., 6 × 9 in. New York, Academic Press Inc., 1966. Price, $6.50.

The goals of this small but fascinating research monograph as given in the Preface are "to introduce some of the tools and techniques of the discipline of distribution theory to the applied mathematician, and to survey some of the very recent and otherwise relatively inaccessible results concerning the distributional boundary behavior of analytic functions, and their application." These goals appear to be quite successfully attained.

The work essentially consists of three chapters. The first, Distributions (pp. 1–34), introduces Schwartz distributions with emphasis upon properties of interest to their Fourier transform, discussed at the end of the chapter. It is concise and though quite well-written may be said to assume some familiarity with the concepts.

The short second chapter introduces the Laplace transform of distributions as preparation for the primary Chapter III, Distributional Boundary Values of Analytic Functions.

Although several other results are obtained, as for the Hilbert transform, the value of the book lies in the three results presented in Chap. III: (1) the distributional Poisson integral of a distribution which is a sum of derivatives of square integrable functions has a distributional boundary value on the imaginary axis which is the distribution itself (Thm. 3.8, p. 70); (2) the analytic continuation result: "the distributional boundary value on any open set uniquely determines not only the originating holomorphic function but the remainder of the distributional boundary value on the complement of the set" (p. 80); (3) the characterization of bounded-real scattering matrices in terms of a derivative of their imaginary axis distributional boundary value expressed as a convolution (Thm. 3.20, p. 93).

Essentially these are new results all of which are of considerable value to applied mathematicians, quantum physicists, and network theorists. Further, these results are neatly and clearly expressed and represent the research orientation of the book. Its usefulness lies in that it presents new results of extreme generality in a short space using a clear exposition which takes advantage of the compactness of notation afforded by the theory of distributions. Among the shortcomings, one can mention that a list of symbols and a better index would be of considerable use in a research work of this nature.

Also, though the physical motivation for the need of the book's results is often mentioned, the physical aspects of the theory are scarcely explored after the results are obtained; one could perhaps profit by interpretations in the areas of quantum mechanics and network theory where the results should prove of considerable value.

However, the conciseness of the treatment and generality of results make it suitable as a text for seminars in applied mathematics. The physical significance of its results make it ideal for self study by researchers in almost all areas of the mathematically oriented sciences.

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MODAL APPROXIMATIONS: THEORY AND APPLICATION TO REACTOR PHYSICS, by W. M. Stacey, Jr., 122 pages, 6 × 9 in. Cambridge, Mass., M. I. T. Press, 1967. Price, $6.00.

Within the last few years there has been a continuously increasing demand from nuclear reactor technologists for more accurate descriptions of the neutron flux distribution in nuclear reactors. The answer to this need, i.e., the solution of the multidimensional neutron diffusion equation by finite difference approximations in a dense enough mesh point set, is still prohibitively expensive.

As a consequence, a great deal of effort is being devoted to the development of other approximation techniques that can produce reasonably accurate multidimensional flux descriptions at appreciable savings in computing time. The majority of the alternative approximation techniques developed, fall in the general category of modal approximations.

The need has also been expressed for simplified descriptions of the neutronic processes in fast reactors which avoid the complexity of the multi-group approach generally