

we can obtain a representation of f in the form (1). This is the "interpolation problem". The solution in case (2) is given by the Taylor expansion and that in (3) by the two-point Lidstone expansion

$$f(z) = \sum A_n(1-z)f^{(2n)}(0) + \sum A_n(z)f^{(2n)}(1),$$

where the polynomials $A_n(z)$ are defined by

$$\frac{\sinh zw}{\sinh w} = \sum A_n(z)w^{2n}.$$

This is valid, for instance, when $f(z)$ is an entire function of exponential type less than π .

These two problems are studied by a general method—"kernel expansion"—for wide classes of polynomials (defined by generating functions) and for the cases when $f(z)$ is entire, or regular at the origin.

The material is accessible to those familiar with the classical methods of complex variable theory, and its study by numerical analysts is recommended. It will, for instance, encourage us to get off the real axis, reveal some thought-provoking "bad examples" (e.g., non-uniqueness in (1)), and show us how mathematics should be written.

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27[X].—RUDOLPH E. LANGER, Editor, *Symposium on Numerical Approximation*, The University of Wisconsin Press, Madison, 1959, x + 462 p., 24 cm. Price \$4.50.

The present volume auspiciously launches the publication efforts of Professor Langer's group at the Mathematics Research Center. It contains the proceedings of a symposium conducted at the University of Wisconsin, April 21–23, 1958. The papers (original and expository) present such a well-rounded survey of numerical approximation because of the careful selection of the invited contributors. A listing of the authors and the titles of their papers will serve to indicate the level and scope of the work.

A. M. Ostrowski	On Trends and Problems in Numerical Approximation
R. C. Buck	Linear Spaces and Approximation Theory
Z. Kopal	Operational Methods in Numerical Analysis Based on Rational Approximations
P. J. Davis	On the Numerical Integration of Periodic Analytic Functions
H. E. Salzer	Some New Divided Difference Algorithms for Two Variables
P. C. Hammer	Numerical Evaluation of Multiple Integrals
M. Golomb	Optimal Approximation and Error Bounds
A. Sard	The Rationale of Approximation
J. L. Walsh	On Extremal Approximations
E. L. Stiefel	Numerical Methods of Tchebycheff Approximation
L. Fox	Minimax Methods in Table Construction

T. S. Motzkin	Existence of Essentially Nonlinear Families Suitable for Oscillatory Approximation
I. J. Schoenberg	On Variation Diminishing Approximation Methods
M. Golomb	Approximation by Functions of Fewer Variables
J. C. P. Miller	Extremal Approximations—A Summary
R. C. Buck	Survey of Recent Russian Literature on Approximation
F. L. Bauer	The Quotient-Difference and Epsilon Algorithms
J. B. Rosser	Some Sufficient Conditions for the Existence of an Asymptotic Formula or an Asymptotic Expansion
J. W. Tukey	The Estimation of (Power) Spectra and Related Quantities
L. Collatz	Approximation in Partial Differential Equations
J. Todd	Special Polynomials in Numerical Analysis

E. I.

28[X].—RUDOLPH E. LANGER, Editor, *Frontiers of Numerical Mathematics*, The University of Wisconsin Press, Madison, 1960, xi + 132 p., 24 cm. Price \$3.50.

This book contains eight papers and a discussion of these papers presented at a Symposium held at Madison, Wisconsin on October 30–31, 1959. This symposium was conducted jointly by the Mathematics Research Center, the United States Army, and the National Bureau of Standards. Its purpose “was not intended to be an occasion for the presentation of research results, but one for a survey of the future; for the identification of some mathematical problems that will have to be faced in the lines of scientific advance.”

The authors and the titles of their papers are:

William Prager	Stress Analysis in the Plastic Range
Garrett Birkhoff	Some Mathematical Problems of Nuclear Reactor Theory
Zdenek Kopal	Numerical Problems of Contemporary Celestial Mechanics
Lee Arnold	Aeroelasticity
Phillip M. Morse	Operations Research
Joseph O. Hirschfelder	Mathematical Bottlenecks in Theoretical Chemistry
S. Chandrasekhar	Magnetohydrodynamics
J. Smagorinsky	On the Application of Numerical Methods to the Solution of Systems of Partial Differential Equations Arising in Meteorology

It is unfortunate that the paper by Lee Arnold was made from a tape recording and was not finally reviewed by the author. It is very difficult for a reader to follow this paper, for many statements in it seem to refer to illustrations which are not included.

The reader of this book should not expect to find a detailed discussion of numerically formulated problems arising in various branches of science. He will find, in the main, discussions and reviews of various open mathematical problems in different scientific areas. Some of the papers refer to numerical treatment of these problems. A surprising number indicate a strong preference on the author's part for analytical methods for dealing with their problems.

One can but agree with J. Smagorinsky when he states “that computing ma-