

3 [2.05, 2.35, 2.55, 5, 6].—L. COLLATZ & H. UNGER, Editors, *Funktionalanalytische Methoden der Numerischen Mathematik*, Birkhäuser Verlag, Basel, 1969, 143 pp., 25 cm. Price SFr. 24.—.

This volume contains the printed versions of lectures held in 1967 during a conference at the Mathematics Research Institute Oberwolfach (Black Forest). Topics from approximation theory predominate, but there are also lectures on functional equations in Banach space, iterative methods, theory of optimization, and interval arithmetic. A list of the authors and their titles follows.

H. Amann, Iterationsverfahren für die Hammersteinsche Gleichung

R. Ansorge, Zur Existenz verallgemeinerter Lösungen nichtlinearer Anfangswertaufgaben

J. Blatter, Approximative Kompaktheit verallgemeinerter rationaler Funktionen

B. Brosowski, Einige Bemerkungen zum verallgemeinerten Kolmogoroffschen Kriterium

F. Fazekas, Optimierungen mittels matrixalgorithmischer Methoden (MAM)

F. Fazekas, Funktionalanalytische Beziehungen bei Verallgemeinerungen des Vialzentrum-Problems

H.-P. Helfrich, Ein modifiziertes Newtonsches Verfahren

K.-H. Hoffmann, Über ein Eindeigkeitskriterium bei der Tschebyscheff-Approximation mit regulären Funktionensystemen

H. Van Iperen, Beste Approximation mit Potenzen verallgemeinerter Bernsteinoperatoren

P. J. Laurent, Charakterisierung und Konstruktion einer Approximation in einer konvexen Teilmenge eines normierten Raumes

H. Leipholz, Über die Erweiterungen der Verfahren von Grammel und Galerkin und deren Zusammenhang

Ramon E. Moore, Functional Analysis for Computers

J. Nitsche, Zur Frage optimaler Fehlerschranken bei Differenzenverfahren

E. Schock, Beste Approximation von Elementen eines nuklearen Raumes

H. Werner, Der Existenzsatz für das Tschebyscheffsche Approximationsproblem mit Exponentialsummen

W. G.

4 [2.05, 3, 4, 5, 6].—P. L. BUTZER & B. SZÖKEFALVI-NAGY, Editors, *Abstract Spaces and Approximation*, Proceedings of a Conference held at the Mathematical Research Institute at Oberwolfach, Germany, July 18–27, 1968, Birkhäuser Verlag, Basel, 1969, 423 pp., 24 cm. Price SFr 68.—.

These proceedings contain an article on the life and work of Jean Farvard, to whose memory the volume is dedicated, a section on new and unsolved problems, and the following 39 papers.

I. Operator Theory

- P. R. HALMOS: Invariant subspaces.....
 I. I. HIRSCHMAN, Jr.: The asymptotic behavior of finite section Wiener-Hopf equations.....
 R. G. DOUGLAS: On the spectrum of Toeplitz and Wiener-Hopf operators.....
 R. S. PHILLIPS: Scattering theory for hyperbolic equations.....

- B. SZ.-NAGY: Hilbertraum-Operatoren der Klasse C_0
 U. WESTPHAL: Über Potenzen von Erzeugern von Halbgruppenoperatoren.....

II. Interpolation and Approximation on Banach Spaces

- G. G. LORENTZ and T. SHIMOGAKI: Interpolation theorems for spaces Λ
 R. O'NEILL: Adjoint operators and interpolation of linear operators.....
 H. BERENS: Über Approximationsprozesse auf Banachräumen.....
 P. L. BUTZER und K. SCHERER: Über die Fundamentalsätze der klassischen Approximationstheorie in abstrakten Räumen.....
 G. ALEXITS: Über die Charakterisierung von Funktionenklassen durch beste lineare Approximation.....
 I. SINGER: Some remarks and problems on bases in Banach spaces.....
 B. BROSOWSKI: Nichtlineare Approximation in normierten Vektorräumen.....

III. Harmonic Analysis and Approximation

- P. R. MASANI: An explicit form for the Fourier-Plancherel transform over locally compact Abelian groups.....
 R. A. HIRSCHFELD: Conjugacy of transformation groups.....
 J.-P. KAHANE: Approximation par des exponentielles imaginaires; ensembles de Dirichlet et ensembles de Kronecker.....
 H. S. SHAPIRO: Approximation by trigonometric polynomials to periodic functions of several variables.....
 E. GÖRLICH: Saturation theorems and distributional methods.....
 G. SUNOUCHI: Derivatives of a trigonometric polynomial of best approximation....
 L. LEINDLER: On strong summability of Fourier series.....
 J. L. B. COOPER: Linear transformations subject to functional equations induced by group representations.....
 P. G. ROONEY: Generalized H_p spaces and Laplace transforms.....
 T. K. BOEHME: Approximation by convolution.....

IV. Algebraic and Complex Approximation

- T. J. RIVLIN: A duality theorem and upper bounds for approximation.....
 R. B. SCHNABL: Zum Saturationsproblem der verallgemeinerten Bernsteinoperatoren.
 M. W. MÜLLER: Über die Approximation durch Gammaoperatoren.....
 P. O. RUNCK: Bemerkungen zu den Approximationssätzen von Jackson und Jackson-Timan.....
 M. V. GOLITSCHEK: Jackson-Sätze für Polynome $\sum_{i=0}^n a_i x^{2i}$
 ELENA POPOVICIU: Sur la notion de convexité par rapport à un procédé d'interpolation.....
 T. POPOVICIU: Sur la conservation de l'allure de convexité des fonctions par des polynomes d'approximation.....
 J. KOREVAAR and C. K. CHUI: Potentials of families of unit masses on disjoint Jordan curves.....
 P. C. CURTIS, Jr.: On a theorem of Keldysh and Wiener.....

V. Numerical and Spline Approximation, Differential Equations

- A. M. OSTROWSKI: Über das Restglied der Euler-Maclaurinschen Formel.....

- K. ZELLER: Runge-Kutta-Approximationen.....
 J. NITSCHKE: Eine Bemerkung zur kubischen Spline-Interpolation.....
 A. SHARMA and A. MEIR: Convergence of a class of interpolatory splines.....
 W. WALTER: Approximation für das Cauchy-Problem bei parabolischen Differentialgleichungen mit der Linienmethode.....
 H. GÜNZLER and S. ZAIDMAN: Abstract almost periodic differential equations.....
 J. LÖFSTRÖM: On the rate of convergence of difference schemes for parabolic initial-value problems and of singular integrals.....

In this volume, special emphasis is placed on theoretical aspects of approximation theory and closely related topics of functional analysis. The volume also contains articles on other topics of functional analysis and on numerical analysis. The classical topics of approximation theory are well represented, while the active field of approximation by splines and other piecewise polynomial functions is discussed in only two of the papers. The influence of Jean Farvard is strongly felt in several contributions on saturation theory.

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- 5 [2.10, 7.00].—ROBERT PIESSENS, *Gaussian Quadrature Formulas for the Numerical Integration of Bromwich's Integral and the Inversion of the Laplace Transform*, Report TW1, Applied Mathematics Section, University of Leuven, June 1969, 10pp. + tables (48 unnumbered pp.), 27 cm. Copy deposited in UMT file.

If $F(p)$ is the Laplace transform of $f(t)$ and s is a positive parameter such that $p^s F(p)$ is analytic and has no branch point at infinity, then the tables in this report consist of 16S floating-point values of the coefficients A_k and p_k in the formula

$$f(t) = t^{s-1} \sum_{k=1}^N A_k (p_k/t)^s F(p_k/t),$$

such that it is exact when $F(p)$ is a linear combination of $p^{-(s+k)}$ for $k = 0(1)2N - 1$. As the author notes, such a parameter s may not exist for some Laplace transforms; nevertheless, even in such cases it is claimed that the formula gives good numerical results.

The coefficients p_k and A_k are complex numbers, occurring in conjugate complex pairs; accordingly, it suffices to tabulate only the p_k with positive imaginary part, together with the corresponding A_k , and this is done here for the ranges $N = 6(1)12$ and $s = 0.1(0.1)3(0.5)4$,

$$\frac{1}{3}, \frac{2}{3}, \frac{4}{3}, \frac{5}{3}, \frac{7}{3}, \frac{8}{3}, \frac{10}{3}, \frac{1}{4}, \frac{3}{4}, \frac{5}{4}, \frac{7}{4}, \frac{9}{4}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}.$$

The numbers p_k were calculated as the zeros of generalized Bessel polynomials $P_{N,s}(p^{-1})$ by Newton-Raphson iteration, and the coefficients A_k were then calculated from the relation