QUARTERLY

OF

APPLIED MATHEMATICS

Volume IV | April 1946–January 1947 | Numbers 1–4

QUARTERLY

OF

APPLIED MATHEMATICS

This periodical is published quarterly under the sponsorship of Brown University, Providence, R.I. For its support, an operational fund is being set up to which industrial organizations may contribute. To date, contributions of the following industrial companies are gratefully acknowledged:

BELL TELEPHONE LABORATORIES, INC.; NEW YORK, N. Y.,
THE BRISTOL COMPANY; WATERBURY, CONN.,
CURTISS WRIGHT CORPORATION; AIRPLANE DIVISION; BUFFALO, N. Y.,
EASTMAN KODAK COMPANY; ROCHESTER, N. Y.,
GENERAL ELECTRIC COMPANY; SCHENECTADY, N. Y.,
GULF RESEARCH AND DEVELOPMENT COMPANY; PITTSBURGH, PA.,
LEEDS & NORTHRUP COMPANY; PHILADELPHIA, PA.,
PRATT & WHITNEY, DIVISION NILES-BEMENT-POND COMPANY; WEST HARTFORD, CONN.,
REPUBLIC AVIATION CORPORATION; FARMINGDALE, LONG ISLAND, N. Y.,
UNITED AIRCRAFT CORPORATION; EAST HARTFORD, CONN.,
WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY; PITTSBURGH, PA.

The QUARTERLY prints original papers in applied mathematics which have an intimate connection with application in industry or practical science. It is expected that each paper will be of a high scientific standard; that the presentation will be of such character that the paper can be easily read by those to whom it would be of interest; and that the mathematical argument, judged by the standard of the field of application, will be of an advanced character.

Manuscripts submitted for publication in the QUARTERLY OF APPLIED MATHEMATICS should be sent to the Managing Editor, Professor W. Prager, Quarterly of Applied Mathematics, Brown University, Providence 12, R. I., either directly or through any one of the Editors or Collaborators. In accordance with their general policy, the Editors welcome particularly contributions which will be of interest both to mathematicians and to engineers. Authors will receive galley proofs only. Seventy-five reprints without covers will be furnished free; additional reprints and covers will be supplied at cost.

The subscription price for the QUARTERLY is $6.00 per volume (April-January), single copies $2.00. Subscriptions and orders for single copies may be addressed to: Quarterly of Applied Mathematics, Brown University, Providence 12, R.I., or to 450 Ahnaip St., Menasha, Wisconsin.

Entered as second class matter March 14, 1944, at the post office at Providence, Rhode Island, under the act of March 3, 1879. Additional entry at Menasha, Wisconsin.

Reprinted 1974 in U.S.A.

QUARTERLY

OF

APPLIED MATHEMATICS

VOLUME IV

1946

CONTENTS

BOOK REVIEWS

The development of mathematics. By E. T. Bell. Second edition. McGraw-Hill Book Company, Inc., New York and London, 1945. xiii+637 pp. $5.00.

The second edition of this well known book contains about fifty pages of new material. Listed in the order in which they occur in the book, the major additions deal with Moslem algebra, the development of symbolism, lattice theory, cubic surfaces, Levi-Civita's parallel displacement, definition of lengths, areas and volumes, the transition from intuitive to unintuitive thinking in modern mathematics, the development of mathematics in times of war, algebra of relations and consistency proofs. The index, too, has been considerably enlarged. Shorter additional paragraphs are concerned with applied mathematics in World War II, Egyptian algebra, number mysticism, Greek methods of computation, the Egyptian method of constructing a right angle, mathematical realism, the Greek treatment of loci, number theory, geometrical constructions, projective differential geometry, theory of quantics, intuitionism, Whitehead and Russell's Principia Mathematica, the Burali-Forti paradox, quantum theory, Skolem's theorem, Laplace's work on probability, R. A. Fisher's work on statistics, and matrix algebra in modern statistics.

S. PRAGER

Tables of associated Legendre functions. Prepared by the Mathematical Tables Project conducted under the sponsorship of the National Bureau of Standards. Official Sponsor: Lyman J. Briggs. Project Director: Arnold N. Lowan. Columbia University Press, New York, 1945. xxv+303 pp. $5.00.

The main body of the present volume contains tables for $P_n^m(x)$, $dP_n^m(x)/dx$, $i^{-n}P_n^m(ix)$, $i^{-n}dP_n^m(ix)/dx$, $(-1)^m Q_n^m(x)$, $(-1)^{m+1}dQ_n^m(x)/dx$, $-i^{n+2m+1}Q_n^m(ix)$, $i^{n+2m-1}dQ_n^m(ix)/dx$, $P_{n+1/2}^m(x)$, $dP_{n+1/2}^m(x)/dx$, $(-1)^m Q_{n+1/2}^m(x)$ and $(-1)^{m+1}dQ_{n+1/2}^m(x)/dx$ for integral values of m (ranging from 0 to 4) and n (ranging from 0 or 1 to 10 for the functions of integral degree and from -1 to 4 for the functions of half-integral degree). For the greater part, these functions are tabulated to six significant figures for values of the argument which increase from 0 or 1 to 10 by steps of 0.1. The functions $P_n^m(\theta)$ and $dP_n^m(\theta)/dx$ are also tabulated for integral values of m (ranging from 0 or 1 to 4) and n (ranging from 1 to 10), the values of the argument increasing from 0° to 90° by steps of 1°. Auxiliary tables facilitate interpolation.

W. PRAGER

BIBLIOGRAPHICAL LIST

The R.T.P. translations listed below are now available from the Durand Reprinting Committee, in care of California Institute of Technology, Pasadena 4, California.

R.T.P. Translation No. 2503, The Lorin nozzle for aircraft propulsion. By L. J. Goodlet. 40 pages.

R.T.P. Translation No. 2506, Planning on a water surface. By Prof. L. I. Sedow. 28 pages.

R.T.P. Translation No. 2507, Piezo-electric microphone of small dimensions. By L. J. Goodlet. 1 page.

R.T.P. Translation No. 2508, Development of the Weibel welding process for aircraft construction. By F. Heilbing. 8 pages.

R.T.P. Translation No. 2511, Laval nozzles for uniform super-sonic flow. By A. Busemann. 9 pages.

R.T.P. Translation No. 2516, German de-icing technique. 8 pages.

R.T.P. Translation No. 2517, The role of inhibitors in the electrolytic precipitation of metals. By H. Fischer. 16 pages.

R.T.P. Translation No. 2518, Testing of aluminum castings. By Dr. A. von Zeerleder. 6 pages.

R.T.P. Translation No. 2519, On the increase of stress in a plate with circular holes and under tension. By Th. Pöschl. 5 pages.

R.T.P. Translation No. 2523, New equipment of the Junkers research station. By H. Roos. 7 pages.

BOOK REVIEWS

The development of mathematics. By E. T. Bell. Second edition. McGraw-Hill Book Company, Inc., New York and London, 1945. xiii+637 pp. $5.00.

The second edition of this well known book contains about fifty pages of new material. Listed in the order in which they occur in the book, the major additions deal with Moslem algebra, the development of symbolism, lattice theory, cubic surfaces, Levi-Civita's parallel displacement, definition of lengths, areas and volumes, the transition from intuitive to unintuitive thinking in modern mathematics, the development of mathematics in times of war, algebra of relations and consistency proofs. The index, too, has been considerably enlarged. Shorter additional paragraphs are concerned with applied mathematics in World War II, Egyptian algebra, number mysticism, Greek methods of computation, the Egyptian method of constructing a right angle, mathematical realism, the Greek treatment of loci, number theory, geometrical constructions, projective differential geometry, theory of quantics, intuitionism, Whitehead and Russell's Principia Mathematica, the Burali-Forti paradox, quantum theory, Skolem's theorem, Laplace's work on probability, R. A. Fisher's work on statistics, and matrix algebra in modern statistics.

S. PRAGER

Tables of associated Legendre functions. Prepared by the Mathematical Tables Project conducted under the sponsorship of the National Bureau of Standards. Official Sponsor: Lyman J. Briggs. Project Director: Arnold N. Lowan. Columbia University Press, New York, 1945. xxv+303 pp. $5.00.

The main body of the present volume contains tables for $P_n^m(x)$, $dP_n^m(x)/dx$, $i^{-n}P_n^m(ix)$, $i^{-n}dP_n^m(ix)/dx$, $(-1)^m Q_n^m(x)$, $(-1)^{m+1}dQ_n^m(x)/dx$, $-i^{n+2m+1}Q_n^m(ix)$, $i^{n+2m-1}dQ_n^m(ix)/dx$, $P_{n+1/2}^m(x)$, $dP_{n+1/2}^m(x)/dx$, $(-1)^m Q_{n+1/2}^m(x)$ and $(-1)^{m+1}dQ_{n+1/2}^m(x)/dx$ for integral values of m (ranging from 0 to 4) and n (ranging from 0 or 1 to 10 for the functions of integral degree and from -1 to 4 for the functions of half-integral degree). For the greater part, these functions are tabulated to six significant figures for values of the argument which increase from 0 or 1 to 10 by steps of 0.1. The functions $P_n^m(\theta)$ and $dP_n^m(\theta)/dx$ are also tabulated for integral values of m (ranging from 0 or 1 to 4) and n (ranging from 1 to 10), the values of the argument increasing from 0° to 90° by steps of 1°. Auxiliary tables facilitate interpolation.

W. PRAGER

BIBLIOGRAPHICAL LIST

The R.T.P. translations listed below are now available from the Durand Reprinting Committee, in care of California Institute of Technology, Pasadena 4, California.

R.T.P. Translation No. 2503, The Lorin nozzle for aircraft propulsion. By L. J. Goodlet. 40 pages.

R.T.P. Translation No. 2506, Planning on a water surface. By Prof. L. I. Sedow. 28 pages.

R.T.P. Translation No. 2507, Piezo-electric microphone of small dimensions. By L. J. Goodlet. 1 page.

R.T.P. Translation No. 2508, Development of the Weibel welding process for aircraft construction. By F. Heilbing. 8 pages.

R.T.P. Translation No. 2511, Laval nozzles for uniform super-sonic flow. By A. Busemann. 9 pages.

R.T.P. Translation No. 2516, German de-icing technique. 8 pages.

R.T.P. Translation No. 2517, The role of inhibitors in the electrolytic precipitation of metals. By H. Fischer. 16 pages.

R.T.P. Translation No. 2518, Testing of aluminum castings. By Dr. A. von Zeerleder. 6 pages.

R.T.P. Translation No. 2519, On the increase of stress in a plate with circular holes and under tension. By Th. Pöschl. 5 pages.

R.T.P. Translation No. 2523, New equipment of the Junkers research station. By H. Roos. 7 pages.