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DICKSON FORD

Encyclopedic Dictionary of Mathematics
American Mathematical Soc. Develops the higher parts of function theory in a unified presentation. Starts with elliptic integrals and functions and uniformization theory, continues with automorphic functions and the theory of

abelian integrals and ends with the theory of abelian functions and modular functions in several variables. The last topic originates with the author and appears here for the first time in book form.

Theta Functions, Elliptic Functions and [pi]

Springer Nature

"This volume contains fourteen articles that represent the AMS Special Session on Special Functions and Orthogonal Polynomials, held in Tucson, Arizona in April of 2007. It gives an overview of the modern field of special functions with all major subfields represented, including: applications to algebraic geometry, asymptotic analysis, conformal mapping, differential equations, elliptic functions, fractional calculus, hypergeometric and q-hypergeometric series, nonlinear waves, number theory, symbolic and numerical evaluation of integrals, and theta functions. A few articles are expository, with extensive bibliographies, but all contain original research." "This book is intended for pure and applied mathematicians who are interested in recent developments in the theory of special functions. It covers a wide range of active areas of research and demonstrates the vitality of the field."--BOOK JACKET.

A Brief Introduction to Theta Functions
American Mathematical Soc.
This monograph presents many interesting results, old and new, about theta functions, Abelian integrals and kernel functions on closed Riemann surfaces. It begins with a review of classical kernel function theory for plane domains. Next there is a discussion of function theory on closed Riemann surfaces, leading to explicit formulas for Szegö kernels in terms of the Klein prime function and theta functions. Later sections develop explicit relations between the classical Szegö and Bergman kernels and between the Szegö and modified (semi-exact) Bergman kernels. The author's results allow him to solve an open problem mentioned by L. Sario and K. Oikawa in 1969.

Ramanujan's Lost Notebook
American Mathematical Soc.
Theta functions were studied extensively by Ramanujan. This book provides a systematic development of Ramanujan’s results and

extends them to a general theory. The author’s treatment of the subject is comprehensive, providing a detailed study of theta functions and modular forms for levels up to 12. Aimed at advanced undergraduates, graduate students, and researchers, the organization, user-friendly presentation, and rich source of examples, lends this book to serve as a useful reference, a pedagogical tool, and a stimulus for further research. Topics, especially those discussed in the second half of the book, have been the subject of much recent research; many of which are appearing in book form for the first time. Further results are summarized in the numerous exercises at the end of each chapter.

Theta Functions
American Mathematical Soc.
During his long and productive career, Salomon Bochner worked in a variety of different areas of mathematics. This four part set brings together his collected papers, illustrating the range and depth of his mathematical interests. The books are available either individually or as a set.

Theta Functions on Riemann Surfaces
Academic Press
This book contains

lectures on theta functions written by experts well known for excellence in exposition. The lectures represent the content of four courses given at the Centre de Recherches Mathematiques in Montreal during the academic year 1991-1992, which was devoted to the study of automorphic forms. Aimed at graduate students, the book synthesizes the classical and modern points of view in theta functions, concentrating on connections to number theory and representation theory. An excellent introduction to this important subject of current research, this book is suitable as a text in advanced graduate courses.
Jacobi's Relation for Theta-functions of Several Complex Varables American Mathematical Soc.
This textbook explores a selection of topics in complex analysis. From core material in the mainstream of complex analysis itself, to tools that are widely used in other areas of mathematics, this versatile compilation offers a selection of many different paths. Readers interested in complex analysis will appreciate the unique combination of topics and connections collected in this book. Beginning

with a review of the main tools of complex analysis, harmonic analysis, and functional analysis, the authors go on to present multiple different, self-contained avenues to proceed. Chapters on linear fractional transformations, harmonic functions, and elliptic functions offer pathways to hyperbolic geometry, automorphic functions, and an intuitive introduction to the Schwarzian derivative. The gamma, beta, and zeta functions lead into L-functions, while a chapter on entire functions opens pathways to the Riemann hypothesis and Nevanlinna theory. Cauchy transforms give rise to Hilbert and Fourier transforms, with an emphasis on the connection to complex analysis. Valuable additional topics include Riemann surfaces, steepest descent, tauberian theorems, and the Wiener–Hopf method. Showcasing an array of accessible excursions, Explorations in Complex Functions is an ideal companion for graduate students and researchers in analysis and number theory. Instructors will appreciate the many options for constructing a second course in complex

analysis that builds on a first course prerequisite; exercises complement the results throughout.
Chapter 16 of Ramanujan's Second Notebook: Theta-Functions and q-Series
Springer Science & Business Media
This book presents the relationship between classical theta functions and knots. It is based on a novel idea of Răzvan Gelca and Alejandro Uribe, which converts Weil's representation of the Heisenberg group on theta functions to a knot theoretical framework, by giving a topological interpretation to a certain induced representation. It also explains how the discrete Fourier transform can be related to 3- and 4-dimensional topology.Theta Functions and Knots can be read in two perspectives. Readers with an interest in theta functions or knot theory can learn how the two are related. Those interested in Chern-Simons theory will find here an introduction using the simplest case, that of abelian Chern-Simons theory. Moreover, the construction of abelian Chern-Simons theory is based entirely on quantum mechanics and not on quantum field theory as it is usually done.Both the theory of theta functions and low

dimensional topology are presented in detail, in order to underline how deep the connection between these two fundamental mathematical subjects is. Hence the book is self-contained with a unified presentation. It is suitable for an advanced graduate course, as well as for self-study.

Theta functions - Bowdoin 1987, Part 1 American Mathematical Soc.

Brief but intriguing monograph on the theory of elliptic functions, written by a prominent mathematician. Spotlights high points of the fundamental regions and illustrates powerful, versatile analytic methods. 1961 edition.

Lecture Notes on Nil-Theta Functions American Mathematical Soc.

The first of a series of three volumes surveying the theory of theta functions and its significance in the fields of representation theory and algebraic geometry, this volume deals with the basic theory of theta functions in one and several variables, and some of its number theoretic applications. Requiring no background in advanced algebraic geometry, the text serves as a modern introduction to the subject.

Partitions, q-Series, and Modular Forms Cambridge

University Press Originally published: New York: Rinehart and Winston, 1961.
Ramanujan's Theta Functions Springer These notes present new as well as classical results from the theory of theta functions on Riemann surfaces, a subject of renewed interest in recent years. Topics discussed here include: the relations between theta functions and Abelian differentials, theta functions on degenerate Riemann surfaces, Schottky relations for surfaces of special moduli, and theta functions on finite bordered Riemann surfaces.
Theta Functions and Division Points on Abelian Varieties of Dimension Two Walter de Gruyter GmbH & Co KG
The theory of theta functions has a long history; for this, we refer A. Krazer and W. Wirtinger the reader to an encyclopedia article by ("Sources" [9]). We shall restrict ourselves to postwar, i. e., after 1945, periods. Around 1948/49, F. Conforto, c. L. Siegel, A. Well reconsidered the main existence theorems of theta functions and found natural proofs for them. These are contained in Conforto: Abelsche Funktionen und

algebraische Geometrie, Springer (1956); Siegel: Analytic functions of several complex variables, Lect. Notes, I.A.S. (1948/49); Well: Theoremes fondamentaux de la theorie des fonctions theta, Sem. Bourbaki, No. 16 (1949). The complete account of Weil's method appeared in his book of 1958 [20]. The next important achievement was the theory of compactification of the quotient variety of Siegel's upper-half space by a modular group. There are many ways to compactify the quotient variety; we are talking about what might be called a standard compactification. Such a compactification was obtained first as a Hausdorff space by I. Satake in "On the compactification of the Siegel space", J. Ind. Math. Soc. 20, 259-281 (1956), and as a normal projective variety by W.L. Baily in 1958 [1]. In 1957/58, H. Cartan took up this theory in his seminar [3]; it was shown that the graded ring of modular forms relative to the given modular group is a normal integral domain which is finitely generated over C

Explorations in Complex Functions Springer

This book presents several results

on elliptic functions and Pi, using Jacobi's triple product identity as a tool to show suprising connections between different topics within number theory such as theta functions, Eisenstein series, the Dedekind delta function, and Ramanujan's work on Pi. The included exercises make it ideal for both classroom use and self-study. **Proceedings of the London Mathematical Society** American Mathematical Soc. V.1. A.N. v.2. O.Z. Apendices and indexes. **Theta Functions, Bowdoin 1987** John Wiley & Sons View the abstract. Tata Lectures on Theta I Courier Corporation In the spring of 1976, George Andrews of Pennsylvania State University visited the library at Trinity College, Cambridge to examine the papers of the late G.N. Watson. Among these papers, Andrews discovered a sheaf of 138 pages in the handwriting of Srinivasa Ramanujan. This manuscript was soon designated, "Ramanujan's lost notebook." Its discovery has frequently been deemed the mathematical equivalent of finding Beethoven's tenth symphony. This volume is the third of five volumes that the authors plan to write on Ramanujan’s lost notebook and other manuscripts and fragments found in The Lost Notebook and Other Unpublished Papers, published by Narosa in 1988. The ordinary partition function p(n) is the focus of this third volume. In particular, ranks, cranks, and congruences for p(n) are in the spotlight. Other topics include the Ramanujan tau-function, the Rogers–Ramanujan functions, highly composite numbers, and sums of powers of theta functions. Review from the second volume: "Fans of Ramanujan's mathematics are sure to be delighted by this book. While some of the content is taken directly from published papers, most chapters contain new material and some previously published proofs have been improved. Many entries are just begging for further study and will undoubtedly be inspiring research for decades to come. The next installment in this series is eagerly awaited." - MathSciNet Review from the first volume: "Andrews a nd Berndt are to be congratulated on the job they are doing. This is the first step...on the way to an understanding of the work of the genius Ramanujan. It should act as an inspiration to future generations of mathematicians to tackle a job that will never be complete." - Gazette of the Australian Mathematical Society

Harmonic Maps and Differential Geometry

Springer Science & Business Media

There are incredibly rich connections between classical analysis and number theory. For instance, analytic number theory contains many examples of asymptotic expressions derived from estimates for analytic functions, such as in the proof of the Prime Number Theorem. In combinatorial number theory, exact formulas for number-theoretic quantities are derived from relations between analytic functions. Elliptic functions, especially theta functions, are an important class of such functions in this context, which had been made clear already in Jacobi's Fundamenta nova. Theta functions are also classically connected with Riemann surfaces and with the modular group $\Gamma = \mathrm{PSL}(2,\mathbb{Z})$, which provide another path for insights into number theory. Farkas and Kra, well-known masters of the theory of Riemann surfaces and the analysis of theta functions, uncover here interesting combinatorial identities by means of the function theory on Riemann surfaces related to the principal congruence subgroups $\Gamma(k)$. For instance, the authors use this approach to derive congruences discovered by Ramanujan for the partition function, with the main ingredient being the construction of the same function in more than one way. The authors also obtain a variant on Jacobi's famous result on the number of ways that an integer can be represented as a sum of four squares, replacing the squares by triangular numbers and, in the process, obtaining a cleaner result. The recent trend of applying the ideas and methods of algebraic geometry to the study of theta functions and number theory has resulted in great advances in the area. However, the authors choose to stay with the classical point of view. As a result, their statements and proofs are very concrete. In this book the mathematician familiar with the algebraic geometry approach to theta functions and number theory will find many interesting ideas as well as detailed explanations and derivations of new and old results. Highlights of the book include systematic studies of theta constant identities, uniformizations of surfaces represented by subgroups of the modular group, partition identities, and Fourier coefficients of automorphic functions. Prerequisites are a solid understanding of complex analysis, some familiarity with Riemann surfaces, Fuchsian groups, and elliptic functions, and an interest in number theory. The book contains summaries of some of the required material, particularly for theta functions and theta constants. Readers will find here a careful exposition of a classical point of view of analysis and number theory. Presented are numerous examples plus suggestions for research-level problems. The text is suitable for a graduate course or for independent reading.

Theta Functions, Bowdoin 1987 Birkhäuser The first part of Chapter 16 in Ramanujan's second notebook is devoted to q-series. Several of the results obtained by Ramanujan are classical, but many are new. In particular, certain elegant q-continued fraction expansions have not appeared heretofore in print. In the remainder of this chapter, Ramanujan develops the theory of the classical theta-functions in a manner different from his nineteenth century predecessors such as Jacobi. Although many of Ramanujan's discoveries about theta-functions are well-known, several new results are also to be found.

Conformal Blocks, Generalized Theta Functions and the Verlinde Formula CRC Press

This volume contains the proceedings of a conference held in Cagliari, Italy, from September 7-10, 2009, to celebrate John C. Wood's 60th birthday. These papers reflect the many facets of the theory of harmonic maps and its links and connections with other topics in Differential and Riemannian Geometry. Two long reports, one on constant mean curvature surfaces by F. Pedit and the other on the construction of harmonic maps by J. C. Wood, open the proceedings. These are followed by a mix of surveys on Prof. Wood's area of expertise: Lagrangian surfaces, biharmonic maps, locally conformally Kahler manifolds and the DDVV conjecture, as well as several research papers on harmonic maps. Other research papers in the volume are devoted to Willmore surfaces, Goldstein-Pedrich flows, contact pairs, prescribed Ricci curvature, conformal fibrations, the Fadeev-Hopf model, the Compact Support Principle and the curvature of surfaces.

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