Automorphic Forms Representations And L Functions Reprint Revision History 6th Printing 2001

This book takes advanced graduate students from the foundations to topics on the research frontier.

Part 2 contains sections on Automorphic representations and L-functions, Arithmetical algebraic geometry and L-functions

James W. Cogdell, Lectures on L-functions, converse theorems, and functoriality for GL_n: Preface Modular forms and their L-functions Automorphic forms Automorphic representations Fourier expansions and multiplicity one theorems Eulerian integral representations Local L-functions: The non-Archimedean case The unramified calculation Local L-functions: The Archimedean case Global L-functions Converse theorems Functoriality Functoriality for the classical groups Functoriality for the classical groups, II Henry H. Kim, Automorphic L-functions: Introduction Chevalley groups and their properties Cuspidal representations L-groups and automorphic L-functions Induced representations Eisenstein series and constant terms L-functions in the constant terms Meromorphic continuation of L-functions Generic representations and their Whittaker models Local coefficients and non-constant terms Local Langlands correspondence Local L-functions and functional equations Normalization of intertwining operators Holomorphy and bounded in vertical strips Langlands functoriality conjecture Converse theorem of Cogdell and Piatetski-Shapiro Functoriality of the symmetric cube Functoriality of the symmetric fourth Bibliography M. Ram Murty, Applications of symmetric power L-functions: Preface The Sato-Tate conjecture Maass wave forms The Rankin-Selberg method Oscillations of Fourier coefficients of cusp forms Poincare series Kloosterman sums and Selberg's conjecture Refined estimates for Fourier coefficients of cusp forms Twisting and averaging of L-series The Kim-Sarnak theorem Introduction to Artin L-functions Zeros and poles of Artin L-functions The Langlands-Tunnell theorem Bibliography

Harmonic Analysis, Group Representations, Automorphic Forms and Invariant Theory

Group Characters, Symmetric Functions, and the Hecke Algebra

Automorphic Forms and Applications

The Eigenbook

Vol.: 33 : No : 2. : Automorphic Forms, Representations, and L-Functions

This graduate-level textbook provides an elementary exposition of the theory of automorphic representations and L-functions for the general linear group in an adelic setting. The authors keep definitions to a minimum and repeat them when reintroduced so that the book is accessible from any entry point, and with no prior knowledge of representation theory. They also include concrete examples of both global and local representations of GL(n), and present their associated L-functions. The theory is developed from first principles for GL(1), then carefully extended to GL(2) with complete detailed proofs of key theorems. Several of the proofs are here presented for the first time, including Jacquet's simple and elegant proof of the tensor product theorem. Finally, the higher rank situation of GL(n) is given a detailed treatment. Containing numerous exercises, this book will motivate students and researchers to begin working in this fertile field of research.

An inexpensive softcover volume aimed at graduate students and interested mathematicians. Made up of notes from a popular lecture course taught at University of California at Berkeley.

The main purpose of the book is to present the reader with various perspectives of the theory of automorphic forms. In addition to detailed and often nonstandard exposition of familiar topics of the theory, with a particular emphasis on analytic aspects, special attention is paid to such subjects as theta-functions and representations of integers by quadratic forms.

Lectures on Automorphic L-functions

Automorphic Forms, Automorphic Representations, and Arithmetic

Topics in Classical Automorphic Forms

Proceedings of the Symposium in Pure Mathematics, Corvallis, Oregon, 1977

Elliptic Curves, Modular Forms, and Their L-functions

Intended as an introductory guide, this work takes for its subject complex, analytic, automorphic forms and functions on (a domain equivalent to) a bounded domain in a finite-dimensional, complex, vector space, usually denoted Cn). Part I, essentially elementary, deals with complex analytic automorphic forms on a bounded domain; it presents H. Cartan's proof of the existence of the projective imbedding of the compact quotient of such a domain by a discrete group. Part II treats the construction and properties of automorphic forms with respect to an arithmetic group acting on a bounded symmetric domain; this part is highly technical, and based largely on relevant results in functional analysis due to Godement and Harish-Chandra. In Part III, Professor Baily extends the discussion to include some special topics, specifically, the arithmetic propertics of Eisenstein series and their connection with the arithmetic theory of quadratic forms. Unlike classical works on the subject, this book deals with more than one variable, and it differs notably in its treatment of analysis on the group of automorphisms of the domain. It is concerned with the case of complex analytic automorphic forms because of their connection with algebraic geometry, and so is distinct from other modern treatises that deal with automorphic forms on a semi-simple Lie group. Having had its inception as graduate- level lectures, the book assumes some knowledge of complex function theory and algebra, for the serious reader is expected to supply certain details for himself, especially in such related areas as functional analysis and algebraic groups. Originally published in 1973. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

Many problems in number theory have simple statements, but their solutions require a deep understanding of algebra, algebraic geometry, complex analysis, group representations, or a combination of all four. The original simply stated problem can be obscured in the depth of the theory developed to understand it. This book is an introduction to some of these problems, and an overview of the theories used nowadays to attack them, presented so that the number theory is always at the forefront of the discussion. Lozano-Robledo gives an introductory survey of elliptic curves, modular forms, and L-functions. His main goal is to provide the reader with the big picture of the surprising connections among these three families of mathematical objects and their meaning for number theory. As a case in point, Lozano-Robledo explains the modularity theorem and its famous consequence, Fermat's Last Theorem. He also discusses the Birch and Swinnerton-Dyer Conjecture and other modern conjectures. The book begins with some motivating problems and includes numerous concrete examples throughout the text, often involving actual numbers, such as 3, 4, 5, $\frac{3344161}{747348}$, and $\frac{2244035177043369699245575130906674863160948472041} {8912332268928859588025535178967163570016480830}$. The theories of elliptic curves, modular forms, and L-functions are too vast to be covered in a single volume, and their proofs are outside the scope of the undergraduate curriculum. However, the primary objects of study, the statements of the main theorems, and their corollaries are within the grasp of advanced undergraduates. This book concentrates on motivating the definitions, explaining the statements of the theorems and conjectures, making connections, and providing lots of examples, rather than dwelling on the hard proofs. The book succeeds if, after reading the text, students feel compelled to study elliptic curves and modular forms in all their glory.

Automorphic Forms and Geometry of Arithmetic Varieties deals with the dimension formulas of various automorphic forms and the geometry of arithmetic varieties. The relation between two fundamental methods of obtaining dimension formulas (for cusp forms), the Selberg trace formula and the index theorem (Riemann-Roch's theorem and the Lefschetz fixed point formula), is examined. Comprised of 18 sections, this volume begins by discussing zeta functions associated with cones and their special values, followed by an analysis of cusps on Hilbert modular varieties and values of L-functions. The reader is then introduced to the dimension formula of Siegel modular forms; the graded rings of modular forms in several variables; and Selberg-Ihara's zeta function for p-adic discrete groups. Subsequent chapters focus on zeta functions of finite graphs and representations of p-adic groups; invariants and Hodge cycles; T-complexes and Ogata's zeta zero values; and the structure of the icosahedral modular group. This book will be a useful resource for mathematicians and students of mathematics.

With Applications in String Theory

Siegel Modular Forms

Automorphic Forms on GL (2)

Automorphic Forms on Adele Groups. (AM-83), Volume 83

Proceedings of the Symposium in Pure Mathematics of the American Mathematical Society Held at Oregon State University, Corvallis, Oregon, July 11-August 5, 1977

Part 1 contains sections on Reductive groups, representations, Automorphic forms and representations)

Automorphic Forms, Representations and L-FunctionsAmerican Mathematical Soc.

Motives were introduced in the mid-1960s by Grothendieck to explain the analogies among the various cohomology theories for algebraic varieties, to play the role of the missing rational cohomology, and to provide a blueprint for proving Weil's conjectures about the zeta function of a variety over a finite field. Over the last ten years or so, researchers in various areas--Hodge theory, algebraic K-theory, polylogarithms, automorphic forms, L-functions, ℓ-adic representations, trigonometric sums, and algebraic cycles--have discovered that an enlarged (and in part conjectural) theory of ``mixed'' motives indicates and explains phenomena appearing in each area. Thus the theory holds the potential of enriching and unifying these areas. This is the second of two volumes containing the revised texts of nearly all the lectures presented at the AMS-IMS-SIAM Joint Summer Research Conference on Motives, held in Seattle, in 1991. A number of related works are also included, making for a total of forty-seven papers, from general introductions to specialized surveys to research papers.

Symposium in Pure Mathematics Held at Oregon State University, Corvallis, Oregon, July 11-August 5, 1977

Automorphic Forms and Geometry of Arithmetic Varieties

An Introduction to the Langlands Program

Automorphic Forms, Representations and L-functions

A Classical and Representation-Theoretic Approach

The theory of automorphic forms has seen dramatic developments in recent years. in particular, important instances of Langlands functoriality have been established. This volume presents three weeks of lectures from the IAS/Park City Mathematics Institute Summer School on automorphic forms and their applications. It addresses some of the general aspects of automorphic forms, as well as certain recent advances in the field. The book starts with the lectures of Borel on the basic theory of automorphic forms, which lay the foundation for the lectures by Cogdell and Shahidi on converse theorems and the Langlands-Shahidi method, as well as those by Clozel and Li on the Ramanujan conjectures and graphs. The analytic theory of GL(2)-forms and L-functions are the subject of Michel's lectures, while Terras covers arithmetic quantum chaos. The volume also includes a chapter by Vogan on isolated unitary representations, which is related to the lectures by Clozel. This volume is recommended for independent study or an advanced topics course. It is suitable for graduate students and researchers interested in automorphic forms and number theory. Information for our distributors: Titles in this series are co-published with the Institute for Advanced Study/Park City Mathematics Institute. Members of the Mathematical Association of America (MAA) and the National Council of Teachers of Mathematics (NCTM) receive a 20% discount from list price.

Detailed exposition of automorphic representations and their relation to string theory, for mathematicians and theoretical physicists.

Automorphic forms and Galois representations have played a central role in the development of modern number theory, with the former coming to prominence via the celebrated Langlands program and Wiles' proof of Fermat's Last Theorem. This two-volume collection arose from the 94th LMS-EPSRC Durham Symposium on 'Automorphic Forms and Galois Representations' in July 2011, the aim of which was to explore recent developments in this area. The expository articles and research papers across the two volumes reflect recent interest in p-adic methods in number theory and representation theory, as well as recent progress on topics from anabelian geometry to p-adic Hodge theory and the Langlands program. The topics covered in volume one include the Shafarevich Conjecture, effective local Langlands correspondence, p-adic L-functions, the fundamental lemma, and other topics of contemporary interest.
Automorphic Representations and L-Functions for the General Linear Group:
Automorphic Forms, Representations, and L-functions
p-Adic Automorphic Forms on Shimura Varieties

Proceedings International Summer School, University of Antwerp, RUCA, July 17 - August 3, 1972

This book presents a treatment of the theory of L-functions developed via the theory of Eisenstein series and their Fourier coefficients. The author is a co-developer of the important Langlands-Shahidi method. This account of the theory is ideal for graduate students and researchers interested in the Langlands program in automorphic forms and its connections with number theory.

Featuring the work of twenty-three internationally-recognized experts, this volume explores the trace formula, spectra of locally symmetric spaces, p-adic families, and other recent techniques from harmonic analysis and representation theory. Each peer-reviewed submission in this volume, based on the Simons Foundation symposium on families of automorphic forms and the trace formula held in Puerto Rico in January-February 2014, is the product of intensive research collaboration by the participants over the course of the seven-day workshop. The goal of each session in the symposium was to bring together researchers with diverse specialties in order to identify key difficulties as well as fruitful approaches being explored in the field. The respective themes were counting cohomological forms, p-adic trace formulas, Hecke fields, slopes of modular forms, and orbital integrals.

This volume uses a unified approach to representation theory and automorphic forms. It collects papers, written by leading mathematicians, that track recent progress in the expanding fields of representation theory and automorphic forms and their association with number theory and differential geometry. Topics include: Automorphic forms and distributions, modular forms, visible-actions, Dirac cohomology, holomorphic forms, harmonic analysis, self-dual representations, and Langlands Functoriality Conjecture, Both graduate students and researchers will find inspiration in this volume.

Explicit Constructions of Automorphic L-Functions

Automorphic Forms and Representations

Automorphic Forms on GL (3,TR)

NSF-CBMS Regional Conference in Mathematics on Euler Products and Eisenstein Series, May 20-24, 1996, Texas Christian University

Automorphic Forms, Representations and L-Functions

Part one of a two-volume collection exploring recent developments in number theory related to automorphic forms and Galois representations.

Automorphic forms are an important complex analytic tool in number theory and modern arithmetic geometry. They played for example a vital role in Andrew Wiles's proof of Fermat's Last Theorem. This text provides a concise introduction to the world of automorphic forms using two approaches: the classic elementary theory and the modern point of view of adeles and representation theory. The reader will learn the important aims and results of the theory by focussing on its essential aspects and restricting it to the 'base field' of rational numbers. Students interested for example in arithmetic geometry or number theory will find that this book provides an optimal and easily accessible introduction into this topic.

?This book discusses the p-adic modular forms, the eigencurve that parameterize them, and the p-adic L-functions one can associate to them. These theories and their generalizations to automorphic forms for group of higher ranks are of fundamental importance in number theory. For graduate students and newcomers to this field, the book provides a solid introduction to this highly active area of research. For experts, it will offer the convenience of collecting into one place foundational definitions and theorems with complete and self-contained proofs. Written in an engaging and educational style, the book also includes exercises and provides their solution.

Automorphic Forms and Galois Representations
Families of Automorphic Forms and the Trace Formula
Motives
Automorphic Forms
Part 2

L-functions associated to automorphic forms encode all classical number theoretic information. They are akin to elementary particles in physics. This 2006 book provides an entirely self-contained introduction to the theory of L-functions in a style accessible to graduate students with a basic knowledge of classical analysis, complex variable theory, and algebra. Also within the volume are many new results not yet found in the literature. The exposition provides complete detailed proofs of results in an easy-to-read format using many examples and without the need to know and remember many complex definitions. The main themes of the book are first worked out for GL(2,R) and GL(3,R), and then for the general case of GL(n,R). In an appendix to the book, a set of Mathematica functions is presented, designed to allow the reader to explore the theory from a computational point of view.

An international Summer School on: "Modular functions of one variable and arithmetical applications" took place at RUCA, Antwerp University, from July 17 to - gust 3, 1972. This book is the first volume (in a series of four) of the Proceedings of the Summer School. It includes the basic course given by A. Ogg, and several other papers with a strong analyt~c flavour. Volume 2 contains the courses of R. P. Langlands (l-adic rep resentations) and P. Deligne (modular schemes - representations of GL) and papers on related topics. 2 Volume 3 is devoted to p-adic properties of modular forms and applications to l-adic representations and zeta functions. Volume 4 collects various material on elliptic curves, includ ing numerical tables. The School was a NATO Advanced Study Institute, and the orga nizers want to thank NATO for its major subvention. Further support, in various forms, was received from IBM Belgium, the Coca-Cola Co. of Belgium, Rank Xerox Belgium, the Fort Food Co. of Belgium, and NSF Washington, D.C • • We extend our warm est thanks to all of them, as well as to RUCA and the local staff (not forgetting hostesses and secretaries!) who did such an excellent job.

This book presents a broad, user-friendly introduction to the Langlands program, that is, the theory of automorphic forms and its connection with the theory of L-functions and other fields of mathematics. Each of the twelve chapters focuses on a particular topic devoted to special cases of the program. The book is suitable for graduate students and researchers.

Automorphic Forms, Representations and L-Functions

Eisenstein Series and Automorphic L-functions

Modular Functions of One Variable I

Eisenstein Series and Automorphic Representations

Representation Theory and Automorphic Forms

This monograph introduces two approaches to studying Siegel modular forms: the classical approach as holomorphic functions on the Siegel upper half space, and the approach via representation theory on the symplectic group. By illustrating the interconnections shared by the two, this book fills an important gap in the existing literature on modular forms. It begins by establishing the basics of the classical theory of Siegel modular forms, and then details more advanced topics. After this, much of the basic local representation theory is presented. Exercises are featured heavily throughout the volume, the solutions of which are helpfully provided in an appendix. Other topics considered include Hecke theory, Fourier coefficients, cuspidal automorphic representations, Bessel models, and integral representation. Graduate students and young researchers will find this volume particularly useful. It will also appeal to researchers in the area as a reference volume. Some knowledge of GL(2) theory is recommended, but there are a number of appendices included if the reader is not already familiar.

This was the conference on L-functions and automorphic forms.

The goal of this research monograph is to derive the analytic continuation and functional equation of the L-functions attached by R.P. Langlands to automorphic representations of reductive algebraic groups. The first part of the book (by Piatetski-Shapiro and Rallis) deals with L-functions for the simple classical groups; the second part (by Gelbart and Piatetski-Shapiro) deals with non-simple groups of the form G GL(n), with G a quasi-split reductive group of split rank n. The method of proof is to construct certain explicit zeta-integrals of Rankin-Selberg type which interpolate the relevant Langlands L-functions and can be analyzed via the theory of Eisenstein series and intertwining operators. This is the first time such an approach has been applied to such general classes of groups. The flavor of the local theory is decidedly representation theoretic, and the work should be of interest to researchers in group representation theory as well as number theory.

Symposium in Pure Mathematics, Held at Oregon State University, July 11-August 5, 1977, Corvallis, Oregon

Proceedings of Symposia in Pure Mathematics

Introductory Lectures on Automorphic Forms

Volume 1

Automorphic Forms and L-Functions for the Group GL(n,R)

This volume investigates the interplay between the classical theory of automorphic forms and the modern theory of representations of adele groups. Interpreting important recent contributions of Jacquet and Langlands, the author presents new and previously inaccessible results, and systematically develops explicit consequences and connections with the classical theory. The underlying theme is the decomposition of the regular representation of the adele group of GL(2). A detailed proof of the celebrated trace formula of Selberg is included, with a discussion of the possible range of applicability of this formula. Throughout the work the author emphasizes new examples and problems that remain open within the general theory. TABLE OF CONTENTS: 1. The Classical Theory 2. Automorphic Forms and the Decomposition of L2(PSL(2,R) 3. Automorphic Forms as Functions on the Adele Group of GL(2) 4. The Representations of GL(2) over Local and Global Fields 5. Cusp Forms and Representations of the Adele Group of GL(2) 6. Hecke Theory for GL(2) 7. The Construction of a Special Class of Automorphic Forms 8. Eisenstein Series and the Continuous Spectrum 9. The Trace Formula for GL(2) 10. Automorphic Forms on a Quaternion Algebr?

In the early years of the 1980s, while I was visiting the Institute for Ad vanced Study (IAS) at Princeton as a postdoctoral member, I got a fascinating view, studying congruence modulo a prime among elliptic modular forms, that an automorphic L-function of a given algebraic group G should have a canon ical p-adic counterpart of several variables. I immediately decided to find out the reason behind this phenomenon and to develop the theory of ordinary p-adic automorphic forms, allocating 10 to 15 years from that point, putting off the intended arithmetic study of Shimura varieties via L-functions and Eisenstein series (for which I visited IAS). Although it took more than 15 years, we now know (at least conjecturally) the exact number of variables for a given G, and it has been shown that this is a universal phenomenon valid for holomorphic automorphic forms on Shimura varieties and also for more general (nonholomorphic) cohomological automorphic forms on automorphic manifolds (in a markedly different way). When I was asked to give a series of lectures in the Automorphic Semester in the year 2000 at the Emile Borel Center (Centre Emile Borel) at the Poincare Institute in Paris, I chose to give an exposition of the theory of p-adic (ordinary) families of such automorphic forms p-adic analytically de pending on their weights, and this book is the outgrowth of the lectures given there.

Eigenvarieties, families of Galois representations, p-adic L-functions