

Editorial Policy

for the publication of monographs

In what follows all references to monographs, are applicable also to multiauthorship volumes such as seminar notes.

§ 1. Lecture Notes aim to report new developments - quickly, informally, and at a high level. Monograph manuscripts should be reasonably self-contained and rounded off. Thus they may, and often will, present not only results of the author but also related work by other people. Furthermore, the manuscripts should provide sufficient motivation, examples and applications. This clearly distinguishes Lecture Notes manuscripts from journal articles which normally are very concise. Articles intended for a journal but too long to be accepted by most journals, usually do not have this “lecture notes” character. For similar reasons it is unusual for Ph. D. theses to be accepted for the Lecture Notes series.

§ 2. Manuscripts or plans for Lecture Notes volumes should be submitted (preferably in duplicate) either to one of the series editors or to Springer- Verlag, Heidelberg . These proposals are then refereed. A final decision concerning publication can only be made on the basis of the complete manuscript, but a preliminary decision can often be based on partial information: a fairly detailed outline describing the planned contents of each chapter, and an indication of the estimated length, a bibliography, and one or two sample chapters - or a first draft of the manuscript. The editors will try to make the preliminary decision as definite as they can on the basis of the available information.

§ 3. Final manuscripts should be in English. They should contain at least 100 pages of scientific text and should include

- a table of contents;
- an informative introduction, perhaps with some historical remarks: it should be accessible to a reader not particularly familiar with the topic treated;
- a subject index: as a rule this is genuinely helpful for the reader.

Further remarks and relevant addresses at the back of this book.

Editors:

A. Dold, Heidelberg

B. Eckmann, Zürich

F. Takens, Groningen

Subseries:

Mathematisches Institut der Universität und

Max-Planck-Institut für Mathematik, Bonn - vol. 16

Adviser:

Friedrich Hirzebruch



Alexey A. Panchishkin

Non-Archimedean L-Functions

of Siegel and Hilbert Modular Forms

Springer-Verlag Berlin Heidelberg GmbH

Author

**Alexey A. Panchishkin
Moscow State University
Department of Mathematics
Moscow, 119899-USSR**

**Mathematics Subject Classification (1980): Primary: 11F, 11R, 11S
Secondary: 19K, 46F, 46G**

**ISBN 978-3-540-54137-0 ISBN 978-3-662-21541-8 (eBook)
DOI 10.1007/978-3-662-21541-8**

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in other ways, and storage in data banks. Duplication of this publication or parts thereof is only permitted under the provisions of the German Copyright Law of September 9, 1965, in its current version, and a copyright fee must always be paid. Violations fall under the prosecution act of the German Copyright Law.

**© Springer-Verlag Berlin Heidelberg 1991
Originally published by Springer-Verlag Berlin Heidelberg New York in 1991**

2146/3140-543210 - Printed on acid-free paper

Non-Archimedean L -Functions of Siegel and Hilbert modular forms

Content

Introduction	1
Acknowledgement	8
Chapter 1. Non-Archimedean analytic functions, measures and distributions.	9
§1. p -adic numbers and the Tate field.....	9
§2. Continuous and analytic functions over a non-Archimedean field	12
§3. Distributions, measures, and the abstract Kummer congruences	16
§4. Iwasawa algebra and the non-Archimedean Mellin transform.....	22
§5. Complex valued distributions, associated with Euler products	28
Chapter 2. Siegel modular forms and the holomorphic projection operator	35
§1. Siegel modular forms and Hecke operators	37
§2. Theta series, Eisenstein series and the Rankin zeta function	51
§3. Formulas for Fourier coefficients of Siegel – Eisenstein series	58
§4. Holomorphic projection operator and the Maass differential operator	70
Chapter 3. Non-Archimedean standard zeta functions of Siegel modular forms	81
§1. Description of the non-Archimedean standard zeta functions.....	81
§2. Complex valued distributions associated with standard zeta functions of Siegel modular forms	87
§3. Algebraic properties of the special values of normalized distributions	92
§4. Integrality properties and congruences for the distributions.....	110
Chapter 4. Non-Archimedean convolutions of Hilbert modular forms	117
§0. Introduction.....	117
§1. Hilbert modular forms.....	120
§2. Description of the non-Archimedean Rankin convolution of Hilbert automorphic forms	125
§3. Distributions on the Galois group Gal_S	126
§4. The integral representation of Rankin – Shimura and the holomorphic projection operator	133
§5. Integrality properties and congruences for the distributions.....	141
References	146
Subject Index	155

PREFACE

Main subject of the book is the arithmetic of zeta functions of automorphic forms. More precisely, we study p -adic properties of the special values of these functions. For the Riemann zeta function this goes back to the classical Kummer congruences for Bernoulli numbers and their p -adic interpretation given by Kubota – Leopoldt and Mazur. Using the technique of p -adic integration and the Rankin convolution method we construct the p -adic analytic continuation of the standard zeta functions of Siegel modular forms and of the convolutions of Hilbert modular forms. The book is intended for specialists in representation theory, functional analysis, algebraic geometry; it contains, together with new results, much background information about p -adic measures, their Mellin transforms, Siegel and Hilbert modular forms, Hecke operators, acting on them, Euler products etc. It seems that the method developed in the book is rather general and may have a number of further applications.

A.A.Panchishkin,

Moscow, May 1991.