CAMBRIDGE

Cambridge University Press
0521435692 - Elementary Theory of L-functions and Eisenstein Series
Haruzo Hida
Table of Contents
More information

Contents

Suggestions to the reader xi

Chapter 1. Algebraic number theory 1

§1.1. Linear algebra over rings 1
§1.2. Algebraic number fields 5
§1.3. p-adic numbers 17

Chapter 2. Classical *L*-functions and Eisenstein series 25

§2.1. Euler's method 25
§2.2. Analytic continuation and the functional equation 33
§2.3. Hurwitz and Dirichlet *L*-functions 40
§2.4. Shintani *L*-functions 47
§2.5. *L*-functions of real quadratic field 54
§2.6. *L*-functions of imaginary quadratic fields 63
§2.7. Hecke *L*-functions of number fields 66

Chapter 3. p-adic Hecke *L*-functions 73

§3.1. Interpolation series 73
§3.2. Interpolation series in p-adic fields 75
§3.3. p-adic measures on $\mathbf{Z}_p$ 78
§3.4. The p-adic measure of the Riemann zeta function 80
§3.5. p-adic Dirichlet *L*-functions 82
§3.6. Group schemes and formal group schemes 89
§3.7. Toroidal formal groups and p-adic measures 96
§3.8. p-adic Shintani *L*-functions of totally real fields 99
§3.9. p-adic Hecke *L*-functions of totally real fields 102

Chapter 4. Homological interpretation 107

§4.1. Cohomology groups on $\mathbf{G}_m(\mathbf{C})$ 107
§4.2. Cohomological interpretation of Dirichlet *L*-values 117
§4.3. p-adic measures and locally constant functions 118
§4.4. Another construction of p-adic Dirichlet *L*-functions 120

Chapter 5. Elliptic modular forms and their *L*-functions 125

§5.1. Classical Eisenstein series of $GL(2)_{/\mathbf{Q}}$ 125
§5.2. Rationality of modular forms 131
§5.3. Hecke operators 139
§5.4. The Petersson inner product and the Rankin product 150
§5.5. Standard *L*-functions of holomorphic modular forms 157

Chapter 6. Modular forms and cohomology groups 160

§6.1. Cohomology of modular groups 160
§6.2. Eichler-Shimura isomorphisms 167
§6.3. Hecke operators on cohomology groups 175
§6.4. Algebraicity theorem for standard *L*-functions of GL(2) 186
§6.5. Mazur's p-adic Mellin transforms 189

© Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
0521435692 - Elementary Theory of L-functions and Eisenstein Series
Haruzo Hida
Table of Contents
More information

Chapter 7. Ordinary Λ-adic forms, two variable p-adic Rankin products and Galois representations 194

§7.1. p-Adic families of Eisenstein series 195
§7.2. The projection to the ordinary part 200
§7.3. Ordinary Λ-adic forms 208
§7.4. Two variable p-adic Rankin product 221
§7.5. Ordinary Galois representations into $GL_2(\mathbf{Z}_p[[X]])$ 228
§7.6. Examples of Λ-adic forms 234

Chapter 8. Functional equations of Hecke *L*-functions 239

§8.1. Adelic interpretation of algebraic number theory 239
§8.2. Hecke characters as continuous idele characters 245
§8.3. Self-duality of local fields 249
§8.4. Haar measures and the Poisson summation formula 253
§8.5. Adelic Haar measures 257
§8.6. Functional equations of Hecke *L*-functions 261

Chapter 9. Adelic Eisenstein series and Rankin products 272

§9.1. Modular forms on $GL_2(F_{\mathbf{A}})$ 272
§9.2. Fourier expansion of Eisenstein series 282
§9.3. Functional equation of Eisenstein series 292
§9.4. Analytic continuation of Rankin products 298
§9.5. Functional equations of Rankin products 306

Chapter 10. Three variable p-adic Rankin products 310

§10.1. Differential operators of Maass and Shimura 310
§10.2. The algebraicity theorem of Rankin products 317
§10.3. Two variable Λ-adic Eisenstein series 326
§10.4. Three variable p-adic Rankin products 331
§10.5. Relation to two variable p-adic Rankin products 339
§10.6. Concluding remarks 343

Appendix: Summary of homology and cohomology theory 345

References 365

Answers to selected exercises 371

Index 383

© Cambridge University Press www.cambridge.org