

**Special Values of L -functions Associated with
the Space of Quadratic Forms and
the Representation of $Sp(2n, F_p)$
in the Space of Siegel Cusp Forms**

Tsuneo Arakawa

*Dedicated to Professor I. Satake and Professor F. Hirzebruch
for their sixtieth birthdays*

Contents

- Introduction
- Chapter I L -functions of quadratic forms
 - 1.1 Definition of zeta functions and L -functions
 - 1.2 Some properties of $\xi_n^*(s, \tau_S^{(n)})$, $L_2^*(s, \psi_{\det})$, and $L_2^*(s, \psi_{H,p})$
(analytic continuations, poles, residues)
- Chapter II Evaluation of special values of L -functions (the cases of degree two)
 - 2.1 L -functions, and partial zeta functions
 - 2.2 Integral representations of partial zeta functions I
 - 2.3 Integral representations of partial zeta functions II
 - 2.4 Evaluation of special values of $L_2^*(s, \psi_{H,p})$
 - 2.5 Evaluation of special values of $L_2^*(s, \chi_{\det})$, $\xi_2^*(s)$
- Chapter III Some applications to the representation of $Sp(2n, F_p)$ in the space of Siegel cusp forms
 - 3.1 The representation μ_k of $Sp(2n, F_p)$ in the space of cusp forms
 - 3.2 On the integrals $I_n(H_r(\alpha); k)$
 - 3.3 Traces of $\mu_k(\bar{\alpha})$ in the case of degree 4 ($n=2$)

Introduction

0.1. To evaluate special values of various kinds of zeta functions and L -functions and to interpret the meaning of them have been providing fruitful problems to number theory.

Siegel [21], as an initiative work, established an ingenious method of