P R E F A C E

The problem of representation of polynomials in one
variable over a prime field suggested itself naturally when
I attempted to prove, without using the 'Riemann hypothesis',
the result that the class number of an imaginary quadratic
field (over the field of rational functions in one variable
over a finite field) tends to infinity, as the discriminant
tends to infinity in valuation with respect to $1/x$. It was
found out that the problem could not be solved without using
Artin's results given in his thesis on the Dedekind's zeta
function of quadratic function fields. Further, the problem
could not be solved without considering it for the more
general case of representation of a quadratic form by a
quadratic form of order greater than two. Actually the class
number problem is a problem on the representation theory of
polynomials by quadratic forms with restrictions on the
representing elements. This more general solution has not
been considered in the present work. However, Siegel's
identity has been extended to the representation theory of
quadratic forms over the field of rational functions in one
variable over a finite field. Extensions of these results to
algebraic function fields are possible.

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