date accounts of the various techniques they associate with the
author such as: Chebyshev approximation, the $\tau$-method, minimized-
iteration and spectroscopic eigenvalue analysis. They will find many
uses of these methods not only in their day-to-day problems, but
also in their research activities.

JOHN TODD

Die Berechnung der Klassenzahl Abelscher Körper über quadratischen
9$+132$ pp. DM 29.

The class number formula for an abelian extension of the rational
field, originally given by Dirichlet and Kummer for a quadratic or
cyclotomic field respectively, is certainly one of the most beautiful
results in classical number theory. In the present book, the author
studies the problem of establishing a similar formula for the class
number of a finite algebraic number field $K$ which is contained in an
abelian extension of a quadratic field $F$. When $K$ itself is an abelian
extension of $F$, certain results in this direction have been already
obtained by Dedekind, Fueter and Hecke. But the author gives
here a complete and systematic solution of the problem including all
these previous results.

With the introduction explaining the historical background of the
problem, the book is divided into three parts with the following titles:
I. Algebraic, arithmetic and analytic foundations, II. Kronecker's
"Grenzformeln" for the $L$-functions of the ring- and Strahl-classes in
quadratic fields, and their application on the summation of $L$-series,
III. Class number formulae. Of these, the most essential one is the
second part which occupies about two thirds of the whole book.
Here the author carefully carries out the summation of $L$-series with
classical technique, considering several cases separately according as
$F$ is real or imaginary and, also, according to the nature of the con­
ductor of the character in the given $L$-series. The actual computation
is not very simple, but it is neatly given in every detail.

Though the book deals exclusively with a rather special topic, the
final result, namely, the class number formula for $K$, seems to have
wide implications in algebraic number theory, suggesting many im­
portant problems in the field. In case $F$ is imaginary, the class num­
ber of $K$ is expressed in terms of certain singular values of the func­
tions which are familiar in the theory of elliptic modular functions,
and this naturally suggests that there exists a deep relation between
the class number formula and the theory of complex multiplication
which is yet unknown to us. On the other hand, if $F$ is real, the class
number of $K$ is expressed by means of logarithmic integrals of the kind of functions used in the imaginary case and the analogy with the imaginary case suggests that functions related with these integrals might be used in constructing abelian extensions over $F$. Finally, as Hecke noticed, it may be also quite interesting if we can find from these class number formulae some special kind of units in $K$ which correspond to the circular units in a cyclotomic field.

In the present book, none of these problems is discussed. But, as the author hopes, the book will certainly serve as the foundation for those who want to work on this stimulating territory where many branches of mathematics act on each other to solve difficult problems.

KENKICHI IWASAWA