date accounts of the various techniques they associate with the author such as: Chebyshev approximation, the τ-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 Zahlkörpern. By Curt Meyer. Berlin, Akademie-Verlag, 1957. 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 conductor 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 important problems in the field. In case F is imaginary, the class number of K is expressed in terms of certain singular values of the functions 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.

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