ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

406. H. W. Brinkmann: *Relations between zeta-functions of different algebraic fields.*

Let $k_1, k_2, \cdots, k_\nu$ be algebraic fields and $\zeta_i(s)$ the zeta-function of k_i. This paper deals with relations of the form $\zeta_1^{a_1} \zeta_2^{a_2} \cdots \zeta_\nu^{a_\nu} = 1$, where a_i are integers (positive or negative). It is shown how, for given fields k_i, all such relations can be found. Several applications are given. (Received September 27, 1938.)

407. Richard Courant: *Conformal mapping of non-orientable surfaces on plane domains.*

Riemannian manifolds with finite characteristic number but possibly with infinitely many boundaries can be mapped conformally on a plane slit domain so that cross-caps or handles are represented by proper coordination of edges of slits in the plane. This result has been applied by the author to the solution of Plateau's problem for arbitrary topological structure. The present paper is an extension to one-sided surfaces of former results obtained for orientable surfaces. The method consists in a topological discussion of stream lines of an analytic function on the surface with one pole. A detailed proof is contained in a paper on conformal mapping to appear in the American Journal of Mathematics. (Received September 24, 1938.)

408. Richard Courant: *New remarks on Plateau's problem.*

The problem of the existence of minimal surfaces of given topological structure under general boundary conditions is solved by new devices on the basis of a variational problem of the Dirichlet type. In the case of genus zero the parameter domain is a Riemann surface consisting of k unit circles connected in $2k-2$ branch points. For higher genus a corresponding number of full planes are attached in 4 branch points each. After the variational problem has been solved, the character of the solution as a minimal surface is an immediate consequence of the variational conditions for the k boundary circles and the branch points. The possibility of conformal mapping of a k-fold connected domain on a k-fold unit circle with $2k-2$ branch points is a side result. For higher topological structure, the intrinsic advantage of using mapping theorems is discussed. (Received September 27, 1938.)

409. F. A. Ficken: *The Riemannian and affine differential geometry of product-spaces.*

The object of this paper is to discuss systematically the Riemannian (or affine)