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.

1. A. A. Albert: *New proofs of the main theorems on algebras.*

The R. Brauer theorem stating that the direct product of a normal division algebra and its reciprocal algebra is a total matric algebra is used as foundation of the theory. A direct proof of this theorem is obtained as a consequence of the relations between the two regular representations of an algebra. Wedderburn's theorem, stating that if an algebra has a total matric subalgebra this subalgebra is a direct factor, is used then to simplify his determination of the structure of any simple algebra. The Brauer theorem may next be extended immediately to normal simple algebras and applied to show that any scalar extension of a normal simple algebra is normal simple. This treatment results in a considerable simplification of the proofs of the principal theorems on algebras. The repeated application of the Brauer theorem also provides an essential clarification and great condensation of the derivation of the modern theory of normal simple algebras. The exposition will appear in the author's forthcoming Colloquium Lectures. (Received November 21, 1938.)

2. C. B. Allendoerfer: *An n-dimensional Gauss-Bonnet theorem.* Preliminary report.

The classical Gauss-Bonnet theorem is generalized to conformally flat spaces S_n of any even dimension. Let V_{n-1} be a closed subspace of S_n which can be mapped into a unit sphere by a conformal mapping which carries S_n into a flat space. Then an integral (whose integrand is essentially the mean normal curvature of V_{n-1}) over V_{n-1} plus an integral (depending solely on the metric of S_n) throughout the interior of V_{n-1} is equal to the area of an ordinary unit sphere of $n-1$ dimensions. For S_n of odd dimension, the formula omits the integral over the interior of V_{n-1} and modifies the integral over V_{n-1}. (Received November 23, 1938.)

3. C. J. Blackall: *Volume integral invariants of non-holonomic systems.*

In this paper necessary and sufficient conditions are given that a non-holonomic dynamical system, in which the applied forces are functions of the position coordinates only, have a volume integral invariant. Special attention is paid to the case in which the integrand of the invariant integral is a function of the position coordinates only. An example is given to prove that not all analytic conservative non-holonomic systems admit volume integral invariants in which the integrand is non-trivial and analytic. (Received November 21, 1938.)