

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.

ALGEBRA AND THEORY OF NUMBERS

243. Angeline J. Brandt: *The free Lie ring and Lie representations of the full linear group.*

The present paper is a continuation and amplification of a paper of Thrall (Amer. J. Math. vol. 64 (1942) pp. 371-388). In the latter paper a recursion formula was developed from which the irreducible constituents of the m th Lie representation for $m \leq 10$ were obtained. The main result of the present paper is a direct formula for the character of the m th Lie representation, namely $[m] = [\sum \mu(d) s_d^{d'}] / m$ where $dd' = m$, the sum is over all divisors d of m , $\mu(d)$ is the familiar Möbius function and s_d is the trace of A^d , A being an arbitrary element of the full linear group. The nature of the irreducible invariant subspaces of L^m (all forms of degree m in the free Lie ring) is determined by this formula for $m \leq 14$. Certain necessary and certain sufficient conditions are determined in order that a given ideal I be characteristic. Since the intersection of I with the module L^m is an invariant subspace of L^m relative to the representation of the full linear group afforded by L^m , it becomes important to know what elements constitute such a subspace and a method for determining this is developed. (Received October 1, 1943.)

244. R. H. Bruck: *Some results in the theory of quasigroups.*

This paper is primarily intended as an illustration of the usefulness of isotopy in quasigroup theory and as ground work for a later paper on linear non-associative algebras. It is largely devoted to the theory and construction of quasigroups with the inverse property. A quasigroup Q , finite or infinite, has the inverse property if there exist two one-to-one reversible mappings L, R , not necessarily distinct, of Q on itself, such that $b^L \cdot ba = ab \cdot b^R = a$ for all a, b of Q . Also contained in the paper are several new theorems on Moufang quasigroups, an explicit construction of all (Murdoch) abelian quasigroups, and necessary and sufficient conditions that the direct product of two finite quasigroups should contain no sub-quasigroup except itself. (Received August 13, 1943.)

245. Nathan Jacobson: *An extension of Galois theory to non-separable and non-normal fields.*

The extension of Galois theory obtained in this paper is based on two important concepts: self-representation of a field P , that is, a representation of P by matrices with elements in P , and composite (ring) of P with itself. The latter is a generalization of the usual concept of a composite field. With any two self-representations, associate