

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

115. J. H. Bell: *Topics related to the factorization of matrices.*

This paper deals with two problems that are of particular interest in the solution of the unilateral matrix equation. Let \mathfrak{D} be a quasi-field and $\mathfrak{D}[\lambda]$ the polynomial ring of \mathfrak{D} , where λ is a commutative indeterminate. The first problem is: Under what conditions is the matrix A with elements in $\mathfrak{D}[\lambda]$ the left associate of a matrix which is proper of degree k in λ ? A necessary and sufficient condition is obtained. The proof may be shortened in the case that \mathfrak{D} is a field \mathfrak{F} . The second problem, which is considered only in the case of a field \mathfrak{F} , is: Given two nonsingular matrices A and B with elements in $\mathfrak{F}[\lambda]$; if A and B are not left associates, what other proper right divisors of the least common left multiple of A and B exist which are not left associates of A or B ? Various results are obtained for the second problem. These results may be used, with the result obtained in solving the first problem, to show the existence of families of solutions of the unilateral matrix equation, if two solutions satisfying certain conditions are known to exist. (Received January 23, 1941.)

116. A. H. Clifford: *Semigroups admitting relative inverses.*

A semigroup is a system S closed under an associative binary operation: $(ab)c = a(bc)$. S is said to admit relative inverses if for each a in S there exists an element e of S such that (1) $ea = ae = a$, and (2) $aa' = a'a = e$ for some a' in S . The "gross structure" of such an S is determined by showing that S is the class sum of mutually disjoint semigroups S_α of known structure (A. Suschkewitsch, D. Rees) which can be arranged in a semi-lattice P such that the set-product $S_\alpha S_\beta$ of any two of them is wholly contained in the "cross-cut" S_γ of S_α and S_β in P . If the idempotent elements of S commute with each other, then the S_α are groups, and the structure of S can be given completely. (Received January 13, 1941.)

117. A. H. Clifford and Saunders MacLane: *Factor sets of a group in its abstract unit group.*

This paper is an investigation of the structure of the set of group extensions of a certain abstract unit group. This group is one which arises in class field theory and has as group of operators a certain finite group Γ . If Γ is solvable, it is shown by an explicit reduction that the group of group extensions is isomorphic to Schur's multiplier for the group Γ . (Received January 28, 1941.)

118. Marshall Hall: *A problem in partitions.*

Non-void subsets a_1, \dots, a_n of a set $S(x_1, \dots, x_n)$ determine a partition matrix