ABSTRACTS OF PAPERS

ALGEBRA AND THEORY OF NUMBERS

102. A. A. Albert: *Non-associative algebras. II. New simple algebras.*

It is first shown that non-associative algebras A with a unity quantity e and order n have the same properties for decomposition in direct sums as do associative algebras. Let G be any multiplicative group of order n of non-singular linear transformations S on A such that $eS = e$, H be a subset containing I, g be a set of $g_{S,T}$ in A defined for every S and T of G and which are not zero divisors. Then construct the crossed extension $E = (A, G, H, g)$. It is an algebra of order nm with e as unity quantity. For separable algebras A conditions are given that E be simple and central simple. It is always simple (central simple) when A is and when $H = [I]$. Then an iterative process results for extending ordinary crossed products of order r^2 to central simple algebras of order r^t which are necessarily non-associative. Every central simple algebra of order n may be extended by the use of an arbitrary permutation group on n letters and a class of permutation algebras is obtained. Finally, a list of fundamental unsolved problems is given. (Received January 7, 1942.)

103. R. A. Beaumont: *Projections of the prime-power abelian group of order p^m and type $(m-1, 1)$.*

A group H is the projection of a group G if there is a $(1-1)$ correspondence between the set of subgroups of G and the set of subgroups of H which preserves the partial ordering of the subgroups. Since R. Baer has given necessary and sufficient conditions that a group H be a projection of a group G which is the direct product of cyclic groups of order p, in the study of the projections of the prime-power abelian group G of order p^m and type $(m-1, 1)$, we may take $m > 2$. It is shown that if $p > 2$, the only group H, essentially different from G, which is a projection of G is the non-abelian group of order p^m containing an element of order p^{m-1}. If $p = 2$ and $m > 3$, the only group H, essentially different from G, which is a projection of G is the non-abelian group $\{U_1, U_2\}$ where U_1 and U_2 are subject to the sole defining relations: $U_1^{2^{m-1}} = U_2^2 = 1$, $U_2 U_1 U_2 = U^{1+2^{m-1}}$. If $p = 2$ and $m = 3$, a group H is a projection of G if and only if H is isomorphic to G. (Received January 16, 1942.)

104. L. L. Dines: *On the mapping of n quadratic forms.*

A transformation $x_i = Q_i(z)$, $(i = 1, 2, \cdots, n)$, in which each $Q_i(z)$ is a real quadratic form in the real variables $z^1, z^2, \cdots, z^m$, maps the m-dimensional z-space into a set of points $\mathfrak{M}$ in the n-dimensional x-space. The present paper considers properties