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 numered 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

1. R. H. Bruck: *The structure of the rational representations of a wide class of linear groups.*

Let θ, $\phi=\theta^{-1}$ be fixed automorphisms of the underlying field (of characteristic 0 or p). Denote by A^* the transposed of the matrix obtained from A by subjecting its elements to the automorphism ϕ. Attention is restricted to groups $\mathfrak{G}$ of $n\times n$ matrices with the property that A in $\mathfrak{G}$ implies A^* in $\mathfrak{G}$; by choice of ϕ a large number of groups may be brought under review. $\mathfrak{G}$ being taken as a group of transformations of a contravariant vector x^i, the fth Kronecker product of $\mathfrak{G}$ may be regarded as a group of transformations of the linear vector space S of all forms $F(T)=\sum c_{i_1i_2\cdots i_f}T^{i_1i_2\cdots i_f}$, where $T^{i_1i_2\cdots i_f}$ is a contravariant tensor. The fundamental idea of the paper is to analyse the Kronecker product by means of a scalar product defined on S. The scalar product of F and $G=\sum d_{i_1i_2\cdots i_f}T^{i_1i_2\cdots i_f}$ is taken as $F\circ G\equiv\sum \overset{\theta}{c}_{i_1i_2\cdots i_f}d_{i_1i_2\cdots i_f}$, and has properties (1) linearity, (2) $(bF)\circ G=F\circ(b^\theta G)$ $=b^\theta(F\circ G)$, (3) $F\circ G=F_{(A^*)}\circ G_{(A^{-1})}$. (Here $F_{(A)}$ is defined by $F(T)\equiv F_{(A)}(T')$ where $x=Ax'$.) The following special result indicates the nature of the paper: If $\mathfrak{G}$ (over the field of rationals) contains the transposed of each group matrix, the Kronecker product representations are completely reducible. (Received November 12, 1940.)

2. C. C. Camp: *A root cubing method of solving equations.*

Algebraic equations were solved by Dandelin and Graeffe by the well known root squaring process. Instead of squaring the roots the present paper gives a method for cubing the original roots. No Encke roots are needed and the sign of a real root is preserved on successive cubings. The general rule is derived by two independent methods and in the case of the cubic by three. The cases of complex and repeated roots are treated in the applications together with that of distinct real roots. (Received November 23, 1940.)

3. W. D. Duthie: *Segments in ordered sets.*

The notion of "segment" in a linearly ordered set is extended to (partially) ordered sets. Segments in ordered sets are self-dual, and can be used to characterize various special properties of ordered sets such as being a lattice, modular, distributive, or complemented lattice, giving a completely self-dual set of postulates for these lattices. Convex subsets of a lattice are defined in the natural way, and various relations among a lattice and its lattices of segments and convex subsets are discussed,