RESEARCH ANNOUNCEMENTS

The purpose of this department is to provide early announcement of significant new results, with some indications of proof. Although ordinarily a research announcement should be a brief summary of a paper to be published in full elsewhere, papers giving complete proofs of results of exceptional interest are also solicited.

AN n-DIMENSIONAL ANALOGUE OF THE CREMONA-CLEBSCH THEOREM

BY H. GUGGENHEIMER

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1. Given a Cremona transformation T between two complex projective planes P and P', the exceptional elements in both planes form closed subsets $M \subset P$, $M' \subset P'$ such that T induces an analytical homeomorphism of the open sets $P-M$ and $P'-M'$. The analytical sets M and M' may be given a simplicial structure (they are sums of oriented two-dimensional pseudo-manifolds having a finite number of isolated points in common). The famous Cremona-Clebsch theorem on the equality of the number of base points and fundamental curves in each of the planes P, P' implies the fact that the zero and two-dimensional Betti-groups of M and M' are isomorphic. Since neither M nor M' can have any torsion, the isomorphism of the one-dimensional Betti-groups of M and M' follows from the rationality of the curves of the homaloidal net and Cremona's reciprocity theorem on the multiplicities of a fundamental curve in a base point (cf. [1, no. 50]).

In this note, we propose to treat the case of a Cremona transformation between two complex projective spaces P and P' of complex dimension n, and to determine the relations between the additive homology invariants (Betti numbers and torsion coefficients) of the exceptional varieties $M \subset P$, $M' \subset P'$. In order to state our result, we introduce a new numerical character:

Let M be a (reducible) algebraic variety of dimension $n-1$ in n-dimensional complex projective space $P_{(n)}$. The greatest common divisor of the orders of the k-dimensional components of a generic intersection of M with a $(k+1)$-dimensional plane will be denoted by $\tau_{(k)}(M)$.

In our case, both M and M' are of complex dimension $n-1$, since they contain the Jacobian of the respective homaloidal webs. Our result will be the following: