

Each normal C_n image of a line meets each base S_{n-2} in $n-2$ points and does not intersect the ruled variety.

The images of planes intersect R in $(n+1)(n-2)/2$ lines. The plane meets each base S_{n-2} in a point, the image of which is a line meeting n of the base S'_{n-2} and lying on F_2 . Each base S_{n-2} meets R in a manifold of dimensionality $n-3$ and of order $n-1$. For $n=4$, the two-dimensional variety of order 5 has an infinite number of plane elliptic cubic curves, but the corresponding property is not true for larger values of n although the intersections of each base S_{n-2} and R are birationally equivalent.

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ON THE CHARACTERISTIC ROOTS OF MATRIC POLYNOMIALS*

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1. *Introduction.* Unless otherwise stated, all matrices and polynomials are assumed to have coefficients in an arbitrary algebraically closed field K .

Let A and B denote square matrices of order n . If the characteristic roots of every polynomial $f(A, B)$ are all of the form $f(\lambda, \mu)$, where λ and μ are characteristic roots of A and B , respectively, then in accordance with a notation to be introduced below, we shall say that the matrices A, B have property I_n . By a theorem of Frobenius,† the matrices A, B have this property if they are commutative, but this is by no means a necessary condition. The study of pairs of matrices having property I_n has been the subject of papers by Bruton, Ingraham, and Roth.‡ However, in no case have conditions been obtained which are both necessary and sufficient for the existence of this property.

* Presented to the Society, October 26, 1935.

† G. Frobenius, *Über vertauschbare Matrizen*, Sitzungsberichte der Preussischen Akademie der Wissenschaften zu Berlin, 1896, pp. 601–614.

‡ The papers by Bruton and by Ingraham have not yet been published in full but abstracts are available as follows: G. S. Bruton, *Certain aspects of the theory of equations for a pair of matrices*, this Bulletin, vol. 38 (1932), p. 633; M. H. Ingraham, *A study of certain related pairs of square matrices*, this Bulletin, vol. 38 (1932), pp. 633–634. Roth's paper is *On the characteristic values of the matrix $f(A, B)$* , Transactions of this Society, vol. 39 (1936), pp. 234–243.