BRANCH-POINT MANIFOLDS ASSOCIATED WITH A LINEAR SYSTEM OF PRIMALS*

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1. *Introduction.* Linear ∞^{α} systems of primals in S_r have been treated† only for $\alpha=1, 2$. The properties of a linear system are obtained from the characteristics of the jacobian and of the branch-point manifold associated with the system. There are, at present, no means for deriving most of the characteristics of a singular primal or manifold in S_r, especially for $r>4$.

In this paper, a theorem is developed giving a set of characteristics of the branch-point manifolds of the system and its sub-systems. This is a step, not only toward the characterization of a general linear system in S_r, but also toward the study of singular manifolds which contain both nodal and cuspidal manifolds.‡

2. *Definitions and Basic Considerations.* In S_r, the linear ∞^r system, F_r, of primals is defined by the equation

$$\sum \lambda_i f_i = 0, \qquad (i = 1, 2, \cdots, r+1), \tag{1}$$

in which the f_i are general algebraic functions of order n in the $r+1$ homogeneous variables x_i. Then $f_i=0$ is the equation of a primal of order n without singularities in S_r.

The primals of F_r in the r-space (x) are in (1, 1) correspondence with the primes $\sum a_i y_i=0$, $(i=1, 2, \cdots, r+1)$, of an r-space (y). This correspondence is defined by the equations

$$\rho y_i = f_i, \qquad (i = 1, 2, \cdots, r+1).$$

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† T. R. Hollcroft, *Pencils of hypersurfaces*, American Journal of Mathematics, vol. 53 (1931), pp. 929–936; *Nets of manifolds in i dimensions*, Annali di Matematica, (4), vol. 5 (1927–28), pp. 261–267.

‡ These terms will be used: *node*, a double point of a manifold at which the quadric hypercone is entirely general; *nodal manifold of a manifold f*, a manifold for every point of which (except points on pinch and singular loci) the two tangent linear manifolds to f are distinct; *cuspidal manifold of f*, a manifold for all points of which the two tangent linear manifolds to f coincide; *cone* to mean *hypercone* for $r>3$.