m_n, all other solutions being obtained from this solution by the addition of multiples of k.

THEOREM 2. *If the minimum equations of n finite square matrices m_1 to m_n with elements in a field F are relatively prime then for any set of n polynomials $h_1, \cdots, h_m$, in F, a polynomial f may be found such that*

$$f(m_i) = h_i(m_i), \qquad (i = 1, \cdots, n).$$

These theorems specialize to the above mentioned algebraic theorem since each x_i is a one by one matrix with minimum equation $\lambda - x_i = 0$.

It should be noted that in the above discussion no restriction as to the field in which the elements of the matrices may lie is made, nor are the m_i necessarily of the same order.

THE UNIVERSITY OF WISCONSIN

PROBLEMS OF THE CALCULUS OF VARIATIONS WITH PRESCRIBED TRANSVERSALITY CONDITIONS*

BY LINCOLN LA PAZ†

1. *Introduction.* Problems of the calculus of variations in the plane for which a prescribed relation exists between the directions of the extremals and the transversals were first studied by Stromquist‡ and Bliss.§ Recently Rawles,|| using a method based on properties of the Hilbert invariant integral, has given an interesting treatment of the analogous problem in $(x, y_1, \cdots, y_n)$-space.

In the present paper the latter problem is attacked from a quite different point of view.¶ The method here used avoids a restrictive hypothesis made by Rawles with regard to the ex-

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† National Research Fellow, 1928–1929.

‡ Stromquist, Transactions of this Society, vol. 7 (1906), p. 181; Annals of Mathematics, (2), vol. 9 (1907), p. 57.

§ Bliss, Annals of Mathematics, (2), vol. 9 (1907), p. 134.

|| Rawles, Transactions of this Society, vol. 30 (1928), pp. 765–784.

¶ The possibility of approaching the problem from this viewpoint was suggested to the writer by G. A. Bliss.