Choose n to be a prime q represented by C and prime to d. Then $g(q)=2$ if C is ambiguous, $g(q)=1$ if $C\neq C^{-1}$. If a form f_1 is associated with a form g_1 not in C or C^{-1}, $f_1(p^2q)=\sigma g_1(q)=0$. Hence, by (2) and (3), p^2q is represented in exactly $\eta\{p-(d'|p)\}\sigma^{-1}$ classes K, where η is 1 or 2 according as q is represented in only one (ambiguous) or two (reciprocal) primitive classes of discriminant d'.

McGill University

ON A REDUCTION OF A MATRIX BY THE GROUP OF MATRICES COMMUTATIVE WITH A GIVEN MATRIX*

BY P. L. TRUMP

1. *Introduction.* Two $n\times n$ matrices A and B, with elements in any field F, are said to be similar in F if there exists a non-singular $n\times n$ matrix S, with elements in F, such that $S^{-1}AS=B$.

Ingraham† has given a method for finding the most general solution, with elements in F, of the matrix equation

$$P(X) = A,$$

where $P(X)$ is a polynomial with coefficients in F, and A is a square matrix with elements in F. A certain set of dissimilar solutions $X_1, X_2, \cdots, X_k$ were obtained in terms of which the complete system of solutions was seen to be in the form $S^{-1}X_iS$, where S is commutative with A. The X_i's are obviously commutative with A.

The purpose of this investigation is to determine the conditions under which two $n\times n$ matrices C and D are similar under transformations of the group $[S]$ of non-singular matrices S which are commutative with a certain $n\times n$ matrix A, where the matrices C and D are also commutative with A. We then seek to describe possible canonical forms to which such matrices

* Presented to the Society, September 4, 1934. This paper with proofs and detail that are omitted here, is on file as a doctor's thesis at the Library of the University of Wisconsin.

† *On the rational solutions of the matrix equation* $P(X)=A$, Journal of Mathematics and Physics, vol. 13 (1934), pp. 46–50.