Raising each side of this equation to the power l' where

$$l'\frac{l-1}{2} \equiv 1, \qquad (\text{mod } l),$$

we have Kummer's result for $d=1, 2, \cdots, (l-3)/2$.

I think it highly probable that Kummer encountered this question in connection with a problem involving the second factor of the class number of $k(\zeta)$. I shall prove in another article that if the second factor of the class number is divisible by l, then (1) holds with not all the a's divisible by l. A somewhat similar result is proved by Hilbert.*

THE UNIVERSITY OF TEXAS

ON THE RANK EQUATION OF ANY NORMAL DIVISION ALGEBRA†

BY A. A. ALBERT‡

1. *Introduction.* The different types of normal division algebras which have been discovered up to the present depend upon equations with different groups. It has been thought that, as the rank equation of an algebra is invariant under a change of basal units, the groups of the rank equations of these various types of algebras might serve to show their non-equivalence. This notion is shown to be false here, as the group of the rank equation of any normal division algebra is the symmetric group. In proving this theorem a new theorem in the Hilbert theory of an irreducible polynomial whose coefficients are rational functions, with coefficients in any infinite field K, of several parameters is developed.

2. *General Theory.* We shall first give several presupposed

* Loc. cit., pp. 435–437.

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