CONCERNING THE DEGREE OF AN IRREDUCIBLE LINEAR HOMOGENEOUS GROUP.

BY PROFESSOR W. B. FITE.

(Read before the American Mathematical Society, September 6, 1907.)

IN the *Transactions*, volume 8 (1907), pages 107–112, the writer has considered the connection between the degree of an irreducible linear homogeneous group and its abstract group properties. The discussion was limited for the most part to groups whose orders are powers of a prime. In the present paper some of the results of the former paper are extended to other groups.

THEOREM I. *A linear homogeneous group G all of whose invariant operations are similarity substitutions and such that every invariant subgroup contains invariant operations besides identity either is irreducible or is simply isomorphic with each of its irreducible components.*

If G is reducible, suppose that it has been put into its completely reduced form. The invariant operations will not be affected by this change. If any irreducible component were not simply isomorphic with G, the subgroup of G that would correspond to identity in this component would contain invariant operations besides identity. But this is impossible since every invariant operation of G is a similarity substitution. Hence every irreducible component is simply isomorphic with G.

Let G be any group of finite order g that has a cyclic central generated by the operation h of order a (> 1) and when G is written as a regular permutation group, of form

$$(x_{1,1}x_{1,2}\cdots x_{1,a})(x_{2,1}x_{2,2}\cdots x_{2,a})\cdots(x_{g/a,1}x_{g/a,2}\cdots x_{g/a,a}).$$

The linear substitution S

$$y_{i,j}=\sum_{k=1}^{a}\omega^{(k-1)(j-1)}x_{i,k}\quad(i=1,2,\cdots,g/a;\ j=1,2,\cdots,a),$$

where ω is a primitive ath root of unity, transforms G into a semi-canonical form and transforms h into its normal form.*

* *Transactions Amer. Math. Society*, loc. cit., p. 108.