BULLETIN OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 82, Number 3, May 1976

THIN FINITE SIMPLE GROUPS

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Communicated by Olga Taussky Todd, January 28, 1976

Let G be a finite group. Define $e(G)$ to be the maximum of the p-ranks $m_p(M)$ as M ranges over 2-local subgroups of G and p ranges over all odd primes. G is *thin* if $e(G) = 1$. The following classification is obtained:

THEOREM. *Let G be a thin finite simple group. Then G is isomorphic to $L_2(q)$, $L_3(p)$, $p = 1 + 2^a3^b$, $U_3(p)$, $p = -1 + 2^a3^b$, $b = 0$ or 1, p an odd prime, $Sz(2^n)$, $U_3(2^n)$, $L_3(4)$, ${}^3D_4(2)$, ${}^2F_4(2)'$, M_{11}, or J_1.*

G is of *characteristic* 2 *type* if $F^*(M)$ is a 2-group for each 2-local subgroup M of G. It appears that in the near future the problem of classifying the finite simple groups will be reduced to the determination of groups of characteristic 2 type. Those familar with the N-group paper will recognize that the characteristic 2 type classification can be naturally subdivided into the cases $e(G) = 1$, $e(G) = 2$, and $e(G) \geqslant 3$. Hence the thin group classification may be regarded as one step in the program to classify the finite simple groups.

The proof is quite lengthy and will appear elsewhere.

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AMS (MOS) subject classifications (1970). Primary 20D05.

[1]Partial support supplied by the Alfred P. Sloan Foundation and the National Science Foundation.