ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

2. Algebra

1991 MS Classification: 20, 05, 11

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A new classification of groups

For any group G, denote by $\pi_e(G)$ the set of all element orders in G. Given a group G, let $h(\pi_e(G))$ be the number of isomorphism classes of groups with the same set $\pi_e(G)$ of element orders. In terms of the function h , groups G are classified as follows : **irrecognizable groups** if $h(\pi_e(G)) = \infty$; otherwise G is called **recognizable groups**. A recognizable group G is called a k-**recognizable group** if $h(\pi_e(G)) = k$. Usually, an 1-recognizable group is called a **characterizable** group. We prove that many finite simple groups(e. g. sporadic groups except J_2) are characterizable, the groups which have a normal elementary abelian subgroup are irrecognizable and do not find k-recognizable group for $k \geq 3$.