ON QUASI-$\mathcal{F}$-GROUPS

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Let $\mathcal{F}$ be a class of groups. A chief factor H/K of a group G is called $\mathcal{F}$*-central* provided $[H/K]\,\mathrm{Aut}_G(H/K) \in \mathcal{F}$. Otherwise, it is called $\mathcal{F}$*-eccentric.*

Definition 1. *Let $\mathcal{F}$ be a class of groups and G a group. We say that G is a quasi-$\mathcal{F}$-group if for every $\mathcal{F}$-eccentric chief factor H/K of G, every automorphism of H/K induced by an element of G is inner.*

We discuss some aspects of a general theory of finite quasi-$\mathcal{F}$-groups [1] and consider some its applications in studying of finite non-nilpotent groups. In particular, characterizations of finite quasisoluble and quasisupersoluble groups are given. Besides, a new characterization of finite quasinilpotent groups is obtained.

References

1. *Wenbin Guo, Skiba A.N.* On finite quasi-$\mathcal{F}$-groups // Comm. Algebra (in press).

RECOGNITION BY SPECTRUM AMONG COVERS OF THE SIMPLE GROUPS $\mathrm{PSL}_n(q)$

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If a group H is a homomorphic image of a finite group G, we say that G is a *cover* for H. The talk will be devoted to solving [1, Problem 14.60]:

Problem 1. Suppose that G is a proper cover for a finite simple group $L = \mathrm{PSL}_n(q)$, $n \geqslant 3$. Is it true that G contains an element whose order is distinct from the order of every element of L?

There is a direct relation between this problem and the problem of recognizing finite groups by spectrum. Recall that the *spectrum* $\omega(H)$ of a finite group H is the set of its element orders. We say that H is *recognizable (by spectrum) among its covers* if, for every finite group G covering H, the equality of the spectra $\omega(G) = \omega(H)$ implies the isomorphism $G \cong H$. Thus, Problem 1 asks if every simple group $\mathrm{PSL}_n(q)$, $n \geqslant 3$, is recognizable among its covers.

It can be shown that the analysis of Problem 1 may be reduced to the case where the cover G is a natural semidirect product $W \rtimes L$, with W being an elementary abelian p-group, p the defining characteristic for $L = \mathrm{PSL}_n(q)$, and the action of L on W being faithful and absolutely irreducible. This leads naturally to the study of the representations for L in the defining characteristic.

Using the properties of weights of the irreducible modules for algebraic groups of type A_l, we prove the following theorem: