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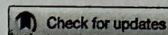


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On equality of absolute central and IA-automorphism groups of finite p -groups

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ABSTRACT

Let G be a finite p -group. Let $\text{Var}(G)$ and $\text{IA}(G)$ respectively denote the group of all absolute central and IA-automorphisms of G . We give necessary and sufficient conditions for a finite non-abelian p -group G such that $\text{Var}(G) = \text{IA}(G)$, and as a consequence, we prove that for a finite non-abelian p -group G of order up to p^4 , $\text{Var}(G) = \text{IA}(G)$ if and only if $G' = L(G)$, where $L(G)$ denotes the absolute center of G .

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1. Introduction

For any group G , Hegarty [7] considered the following definitions of $Z(G)$ and G' :

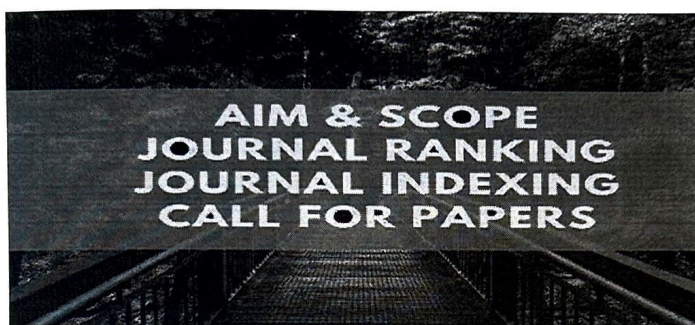
$$Z(G) = \{g \in G \mid \alpha(g) = g, \forall \alpha \in \text{Inn}(G)\}$$
$$G' = \langle g^{-1}\alpha(g) \mid g \in G, \alpha \in \text{Inn}(G) \rangle,$$

and analogously defined the subgroups $L(G)$ and G^* of G as follows:

$$L(G) = \{g \in G \mid \alpha(g) = g, \forall \alpha \in \text{Aut}(G)\}$$
$$G^* = \langle g^{-1}\alpha(g) \mid g \in G, \alpha \in \text{Aut}(G) \rangle.$$

He called $L(G)$ the absolute center of G and G^* the autocommutator subgroup of G . Observe that $L(G) \leq Z(G)$ and $G' \leq G^*$. An automorphism α of G is called a central automorphism if $x^{-1}\alpha(x) \in Z(G)$ for all $x \in G$. The central automorphisms, fix the commutator subgroup G' of G element-wise and form a normal subgroup $\text{Aut}_z(G)$ of $\text{Aut}(G)$. Hegarty [7] analogously defined the absolute central automorphism of G as follows: An automorphism α of G is called an absolute central automorphism if it induces the identity automorphism on $G/L(G)$, or equivalently, $g^{-1}\alpha(g) \in L(G)$ for all $g \in G$. Let $\text{Var}(G)$ denote the group of all absolute central automorphisms of G . Clearly $\text{Var}(G)$ is a normal subgroup of $\text{Aut}(G)$ contained in $\text{Aut}_z(G)$. Moghaddam and Safa [10] have investigated some properties of absolute central automorphisms. It is interesting to find the necessary and sufficient conditions for a group G such that certain subgroups of $\text{Aut}(G)$ are equal. Sufficient work has been done on the equality of $\text{Aut}_z(G)$ with the subgroups of $\text{Aut}(G)$. See for example [2, 3, 5, 12]. In the recent past, there has been some interest on the equality of $\text{Var}(G)$ with the subgroups of $\text{Aut}(G)$. Nasrabadi and Farimani [11] proved that if G

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