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Centralizers in Locally Finite Groups

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Abstract: The topic of the present paper is the following question. Let G be a locally finite group admitting an automorphism ϕ of finite order such that the centralizer $C_G(\phi)$ satisfies certain finiteness conditions.

What impact does this have on the structure of the group G ? Equivalently, one can ask the same question when ϕ is an element of G . Sometimes the impact is quite strong and the paper is a survey of results illustrating this phenomenon. In particular, we concentrate on results where G is shown to have a large nilpotent or soluble subgroup. Naturally, in each case the result depends on the order of the automorphism ϕ and kind of conditions imposed on $C_G(\phi)$. We shall be considering mostly the classical finiteness conditions such as $C_G(\phi)$ being finite, Chernikov, and of finite rank, respectively. It is not a purpose of the paper to survey numerous results on automorphisms of finite groups. In particular, among important topics that are left out of the present discussion are "p-automorphisms of p-groups" (see [36]) and "length problems" (see [73]). However, in some situations (like, for example, when $C_G(\phi)$ is finite) problems on infinite groups quickly reduce to finite groups and in those cases working with finite groups is very natural. A separate section of the paper is devoted to the case when ϕ is of order two, a prime, four, or other, respectively. However, before anything else we address in Section 1 the following related question. Given a periodic group G with an automorphism ϕ , what additional assumptions on G and $C_G(\phi)$ ensure that G is locally finite?

Key Words: Locally finite groups, centralizer

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