Contact information

Ivanna Melnyk
Department of algebra and logic, Ivan Franko National University of Lviv, Lviv, Ukraine
Email address: ivannamelnyk@yahoo.com

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Class of differentiable invertible automatous with an algorithmically solvable conjugacy problem

Denis Morozov

In this abstracts conjugacy problem in the group of finite-state automorphisms of rooted binary tree investigated.

The research of group's automatous is technically complicated. The presentation of group's automatous with p-adic functions provides a convenient technique.

The following results solve the conjugacy problem for differentiable finite-state group's automatous.

Lemma 1. *Let*

$$a = (a_1, a_2) \circ \sigma, b = (b_1, b_2) \circ \sigma$$

$$a' = a_1 \circ a_2, b' = b_1 \circ b_2$$

and a' i b' are conjugated in $FAutT_2$.
Then a i b are conjugated in $FAutT_2$.

Definition 1. We denote the function $\phi_a(x)$ as follows:

$$\phi_a(b) = \begin{cases} -n-1,\ a=1,\ b=2^n(2t+1); \\ 2^s,\ a = 2^s(2k+1)+1, s>0,\ b=0; \\ (2^n \mod 2^s) + 2^s,\ a = 2^s(2k+1)+1, s>0\ b = 2^n(2t+1). \end{cases}$$

Theorem 1. *Two linear automorphisms $f(x) = ax+b$ and $g(x) = cx+d$ are conjugated in $FAutT_2$ then and only i $\phi_a(b) = \phi_c(d)$.*

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Contact information

Denis Morozov
Department of Computer Science, National University of "Kyiv-Mohyla Academy", Kyiv, Ukraine
Email address: denis.morozov178@gmail.com

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On the A-$\mathfrak{F}$-hypercenter of finite groups

Viachaslau Murashka

All groups considered here will be finite. Let $\mathrm{Inn}G \leq A$ be a group of automorphisms of a group G and F be the canonical local definition of a local formation $\mathfrak{F}$. An A-composition factor H/K of G is called *A-$\mathfrak{F}$-central* if $A/C_A(H/K) \in F(p)$ for all $p \in \pi(H/K)$. The *A-$\mathfrak{F}$-hypercenter* of G is the largest subgroup of G such that all its A-composition factors are A-$\mathfrak{F}$-central. This subgroup always exists by Lemma 6.4 [**1**, p. 387]. It is denoted by $\mathrm{Z}_\mathfrak{F}(G, A)$. If $A = \mathrm{Inn}G$, then it is just the $\mathfrak{F}$-hypercenter $\mathrm{Z}_\mathfrak{F}(G)$ of G. If $\mathfrak{F} = \mathfrak{N}$ is the class of all nilpotent groups, then we use $\mathrm{Z}_\infty(G, A)$ to denote the A-hypercenter $\mathrm{Z}_\mathfrak{N}(G, A)$ of G.

Recall that $\mathrm{Syl}_p G$ is the set of all Sylow subgroups of G; *G satisfies the Sylow tower property* if G has a normal Hall $\{p_1, \dots, p_i\}$-subgroup for all $1 \leq i \leq n$ where $p_1 > \dots > p_n$ are all prime divisors of $|G|$. It is well known that a supersoluble group satisfies the Sylow tower property. Recently series of hereditary saturated formations of groups that satisfy the Sylow tower property have been constructed (see, [**2, 3, 4**]).

Theorem 1. *Let $\mathfrak{F}$ be a hereditary saturated formation, F be its canonical local definition and N be an A-admissible subgroup of G where $\mathrm{Inn}G \leq A \leq \mathrm{Aut}G$ that satisfies the Sylow tower property. Then $N \leq \mathrm{Z}_\mathfrak{F}(G, A)$ if and only if $N_A(P)/C_A(P) \in F(p)$ for all $P \in \mathrm{Syl}_p(N)$ and $p \in \pi(N)$.*

Author obtained particular cases of this theorem for $A = \mathrm{Inn}G$ and two formations of supersoluble type (for example, see [**5**]). Recall that a group G is called strictly p-closed if $G/\mathrm{O}_p(G)$ is abelian of exponent dividing $p-1$. We use $\mathfrak{U}$ to denote the class of all supersoluble groups.

Corollary 1 (R. Baer [**6**]). *Let N be a normal subgroup of G. Then $N \leq \mathrm{Z}_\mathfrak{U}(G)$ if and only if N satisfies the Sylow tower property and $N_G(P)/C_G(P)$ is strictly p-closed for all $P \in \mathrm{Syl}_p(N)$ and $p \in \pi(N)$.*

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