

Conjugacy in virtually free groups

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Abstract

Moldavanskii proved in 1969 that, given finitely generated subgroups $H_1, \dots, H_n, K_1, \dots, K_n$ of a free group F , it is decidable whether or not there exists some $x \in F$ such that $xH_ix^{-1} = K_i$ for $i = 1, \dots, n$. As a consequence from the results of Diekert, Gutiérrez and Hagenah (2005) the above problem remains decidable with constraints of type $x \in L$, where L denotes an arbitrary rational subset of F . Making use of automata combinatorics and the dynamical study of the continuous extensions of automorphisms to the boundary of the free group, we can compute the solution set of the equation $x^{-1}\varphi(x) \in L$ for $L \subseteq F$ rational and $\varphi \in \text{Aut}F$ virtually inner. One of the consequences is the generalization of Moldavanskii's Theorem to virtually free groups, inclusive with constraints that go beyond context-free languages.

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