An Application of Word Combinatorics to Group Theory

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Abstract

The solution of the word problem in one-relator groups by W.Magnus, some 75 years ago, is one of the main results of classical combinatorial group theory. His proof is purely algebraic. It strongly relies on the solvability of the membership problem of certain subgroups, generated by proper subsets of the given generators.No other classes of subgroups of one-relator groups are known to have solvable membership problem.

In the present talk we solve the membership problem for a new large class of subgroups, under the assumption that the defining relator satisfies a small cancellation condition. Solvability of the membership problem does not follow in general from the small cancellation condition.We use geometry of van Kampen diagrams in order to reduce the main problem to problems in word combinatorics, which finally we solve.