

THE * PROBLEM FOR FINITE GROUPS

GÁBOR HORVÁTH

The complexity of the term-equivalence, polynomial-equivalence and polynomial-satisfiability problems are well-known for rings (Burris – Lawrence and Szabó – Vértési). These problems are open for groups, there are some results from Burris – Lawrence, Goldmann – Russel and Horváth – Szabó. For semigroups we know almost nothing, the few known results belong to Tesson, Thérien, Volkov, Szabó, Vértési, Klíma.

A new version of these problems was defined in 2003. The algebra is presented with the operation table of the basic operations. But it can be fruitful to compute other operation tables from the clone of the algebra, in advance (i.e. the commutator-table of the given group) as preprocessing. In this case, our expressions can be shortened, so the complexity of the problem can change.

Let us denote with $\text{Term} - \text{EQ}^*$, $\text{Pol} - \text{EQ}^*$ and $\text{Pol} - \text{SAT}^*$ the former problems when we have the possibility to preprocess finitely many new operations with the basic operations of the algebra. Idziak – Szabó in 2004 proved that if $\text{typ}(\mathbf{A}) \subseteq \{2, 3\}$, then $\text{Pol} - \text{SAT}^*(\mathbf{A})$ is in P for nilpotent Sylow algebras and NP -complete for non-nilpotent algebras. They do not say anything about terms. We investigate these questions for groups:

Theorem (G. Horváth, Cs. Szabó, 2004). *For a finite group G*

- *if G is a nilpotent group then $\text{Term} - \text{EQ}^*(G)$ is in P ;*
- *if G is not nilpotent then $\text{Term} - \text{EQ}^*(G)$ is coNP -complete.*

EÖTVÖS LORÁND UNIVERSITY, DEPARTMENT OF ALGEBRA AND NUMBER THEORY, 1117 BUDAPEST, PÁZMÁNY PÉTER SÉTÁNY 1/C, HUNGARY

E-mail address: ghorvath@cs.elte.hu