

Solving equations over finite algebras

Paweł M. Idziak
Computer Science Department
Jagiellonian University

Abstract

For a fixed finite algebra \mathbf{A} consider the following problem:

IN: an equation $t = s$, i.e., a pair (t, s) of terms [polynomials] over \mathbf{A}

OUT: an answer deciding whether this equation has a solution in \mathbf{A} .

We will call these problems $\text{TERMSAT}(\mathbf{A})$ and $\text{POLSAT}(\mathbf{A})$, respectively.

We will discuss the complexity of these two problems for broad classes of algebras. When applying our result to groups we get the following dichotomy:

For a finite group \mathbf{G} the problem $\text{POLSAT}(\mathbf{G})$ is in PTIME if \mathbf{G} is nilpotent and it is NP -complete otherwise.

A brief discussion of similar problems is to be presented.