

We propose a novel SAT-based approach to calculating the number of non-isomorphic algebraic structures of a given type, a significant challenge for current automated tools. Our program uses canonizing sets to build compact lexleader symmetry breaking constraints, enabling the construction of propositional formulas solved with state-of-the-art SAT solvers. In this thesis, we apply this method to effectively identify all non-isomorphic models across finite algebraic structures with a single binary operation, including structures such as semigroups and loops. We provide an implementation of our program and evaluate it on various such structures. The experimental results demonstrate the efficacy of our approach, as we successfully computed previously unknown counts for certain structures, highlighting its potential to address complex enumeration problems.