

Ehrenfeucht-Fraïssé goes elementarily automatic for structures of bounded degree

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Vortrag

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Many relational structures are automatically presentable, i.e. elements of the domain can be seen as words over a finite alphabet and equality and other atomic relations are represented with finite automata. The first-order theories over such structures are known to be primitive recursive, which is shown by the inductive construction of an automaton representing any relation definable in the first-order logic. We propose a general method based on Ehrenfeucht-Fraïssé games to give upper bounds on the size of these automata *and* on the time required to build them. We apply this method for two different automatic structures which have elementary decision procedures, Presburger Arithmetic and automatic structures of bounded degree. For the latter no upper bound on the size of the automata was known. We conclude that the very general and simple automata-based algorithm works well to decide the first-order theories over these structures.