

ON DELETING DETERMINISTIC RESTARTING AUTOMATA THAT HAVE TWO WINDOWS

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ABSTRACT

We study deterministic restarting automata with two windows, abbreviated as det-2-RR-automata. In each cycle of a computation, a det-2-RR-automaton can perform up to two delete operations, one with each of its two windows. We study the class of languages accepted by these automata, comparing it to other well-known language classes and exploring closure properties and algorithmic properties.

Keywords: restarting automaton, language class, closure property, decision problem

1. Introduction

The *restarting automaton*, which was introduced in [9], and many of its variants defined later (see, e. g., [17]) are motivated by techniques and problems from linguistics. The original model of the restarting automaton was presented in order to model the so-called ‘analysis by reduction,’ which is a technique used in linguistics to analyze sentences of natural languages that have free word order. This technique consists in a stepwise simplification of an extended sentence such that the (in)correctness of the sentence is not affected (see, e. g., [9, 11, 21]). Accordingly, a restarting automaton M consists of a flexible tape with end-of-tape markers, a read/write window of a fixed size $k \geq 1$, and a finite-state control. It works in *cycles*, where each cycle begins with the window at the left end of the tape and M being in its initial state. During a cycle M scans the current tape contents from left to right and executes

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