Journal of Automata, Languages and Combinatorics 8 (2003) 3, 539–547 \odot Otto-von-Guericke-Universität Magdeburg

ON MONOTONIC DIRECTABLE NONDETERMINISTIC AUTOMATA¹

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ABSTRACT

A finite automaton is called directable if it has an input word which takes it from every state into the same state. Directability of nondeterministic (n. d.) automata can be defined in different ways. In [7], three notions of directability, D1-, D2-, and D3directability, are introduced. Here, for each i = 1, 2, 3, we present sharp bounds for the maximal lengths of the shortest D*i*-directing words of *n*-state monotonic D*i*-directable n. d. automata.

Keywords: Algebraic theory of automata, nondeterministic automata, directability, synchronizing

1. Introduction

An input word w is called a *directing* (or *synchronizing*) word of an automaton \mathcal{A} if it takes \mathcal{A} from every state to the same state. Directable automata have been studied extensively, while directable nondeterministic (n.d.) automata have obtained fewer interest. For n.d. automata three nonequivalent definitions of directability are introduced and studied in [7]. In accordance with [7], an input word w of an n.d. automaton \mathcal{A} is called

- (1) D1-directing if it takes \mathcal{A} from every state to the same singleton set,
- (2) D2-directing if it takes \mathcal{A} from every state to the same fixed set A' with $\emptyset \subset A' \subset A$,

¹This work has been supported by a collaboration between the Hungarian Academy of Science and the Japan Society for the Promotion of Science, and the Hungarian National Foundation for Scientific Research, Grant T037258.