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GRAPH-CONTROLLED GRAMMARS AS LANGUAGE ACCEPTORS

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ABSTRACT

In this paper, we study the concept of accepting grammars within various forms of regulated grammars like programmed grammars, matrix (set) grammars, grammars with regular (set) control, periodically time-variant grammars as variants of grammars controlled by bicoloured digraphs. We focus on their descriptive capacity. In this way, we continue our studies of accepting grammars [1, 2, 3, 11, 13, 14, 15]. Periodically time-variant grammars yield the first example of a non-trivial equivalence of generating and accepting mode in the absence of appearance checkings.

Keywords: formal languages, regulated rewriting, accepting grammars.

1. Introduction

Regulated rewriting is one of the main and classic topics of formal language theory [5, 26]. Its starting point was to enrich context-free rewriting mechanisms by different kinds of regulations, hence generally enhancing the generative power of such devices compared to the context-free languages. In this way, it is possible to describe more natural phenomena using context-independent derivation rules, see [5].

First, we present various concepts of regulated rewriting as special cases of graphcontrolled rewriting. Then, we concentrate on these mechanisms as language acceptors, contrasting them with the language generating interpretation.

What do we mean by the term "accepting grammar"?

Of course, the core rules are accepting rules as defined in [26, page 9f.]. For the context-free case, this means that, instead of rules of the form $A \to w$, where A is some nonterminal symbol, we have rules of the form $w \to A$. There are in principal (at least) two different ways to arrive at grammars as language accepting devices:

• We can try to create an accepting grammar type which mimics the generating process of another generative grammar step by step. For example, for programmed grammars, this would lead to the following concept. For every labelled rule, there are two label sets σ and ϕ , where σ contains labels of such

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