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GENERATING NETWORKS OF EVOLUTIONARY PROCESSORS WITH RESOURCES RESTRICTED AND STRUCTURE LIMITED FILTERS

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ABSTRACT

In this paper, we continue the research on networks of evolutionary processors where the filters belong to several special families of regular languages. These subregular families are defined by restricting the resources needed for generating or accepting them (the number of states of the minimal deterministic finite automaton accepting a language of the family as well as the number of non-terminal symbols or the number of production rules of a right-linear grammar generating such a language). We insert the newly defined language families into the hierachy of language families obtained by using as filters languages of other subregular families (such as languages which are ordered, non-counting, power-separating, circular, suffix-closed regular, union-free, definite, combinational, finite, monoidal, nilpotent, commutative, codes, or ideals).

Keywords: network, evolutionary processor, generative capacity, regular filter, descriptional complexity

1. Introduction

Networks of language processors have been introduced in [3] by E. Csuhaj-Varjú and A. Salomaa. Such a network can be considered as a graph where the nodes represent processors which apply production rules to the words they contain. In a derivation step (an evolutionary step), any node produces all words, which can be obtained by the application of a rule to a word of its language, as its new language (a word remains unchanged if no rule is applicable to it). In a communication step, any node sends those words to other nodes which satisfy an output condition given as a regular language (called the output filter) and any node adopts (a copy of those) words sent by the other nodes if the words satisfy an input condition also given by

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