

AN EXTENSION OF EXTERNAL CONTEXTUAL ARRAY GRAMMARS

RODICA CETERCHI¹, RADU GRAMATOVICI¹,
ROSIHAN M. ALI², K. G. SUBRAMANIAN²

Based on the study of Mitrana (2005) on Marcus external contextual grammars, we consider here an extension of the array grammars with contextual operations (Subramanian et al, 2008) and study some of its properties.

1. Introduction

Contextual grammars, introduced by Marcus in 1969 in his pioneering work [5], have been intensively investigated by many researchers from different points of view. (See for example, [1, 2, 7]). Unlike Chomsky grammars that involve non-terminal symbols and a rewriting mechanism, contextual grammars have only terminal symbols and generate sets of words by adjoining words, known as contexts, to words, known as selectors. One area of application of contextual grammars has been in two-dimensional array languages. A number of generative grammars have been proposed based on different needs in order to generate languages of arrays. (See for example, [3, 9]). One such study among others [4, 8], is done in [11], by introducing array grammars with contextual operations.

In [6], vectors of words are considered and to each component of such a vector external contextual operations are done resulting in languages of words by the use of concatenation. In the case of arrays which are rectangular arrangements of symbols from an alphabet, there are two kinds of operations, known as column catenation and row catenation which are partial operations. Motivated by the study of Mitrana [6], here we introduce k -external contextual array grammars that involve vectors of arrays all having the same number of rows and allow external contextual array operations in the components to give rise to languages of arrays by the use of column catenation. We compare the generative power with certain other array generating mechanisms. We note that

¹ Faculty of Mathematics and Computer Science, University of Bucharest, Str. Academiei 14, 70109, Bucharest, Romania.

² School of Mathematical Sciences, Universiti Sains Malaysia, 11800 Penang, Malaysia.