

# ON RULE-NUMBER COMPLEXITY OF COMPONENTS OF PROBABILISTIC COOPERATING DISTRIBUTED GRAMMAR SYSTEMS<sup>1, 2</sup>

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## ABSTRACT

In this paper we discuss a size property of Probabilistic Cooperating Distributed Grammar Systems, grammatical constructs designed for modelling distributed random processing. We show that, with respect to the number of productions of a component grammar as a complexity measure, these systems exhibit a language specification of low complexity.

*Keywords:* Grammar systems, probability, cut-point, derivation modes, size complexity

## 1. Introduction

Grammar systems are abstract models for distributed information processing, a mainstream of contemporary computer science. A grammar system, briefly, is a finite set of grammars which cooperate in deriving words of a language. Two main classes of these constructs can be found in the literature: systems whose components work sequentially on the sentential form, in turn, only one being active in every moment, and systems whose components work simultaneously, each on its own sentential form, in a synchronized manner. The former ones are called cooperating distributed (CD) grammar systems [5], and the latter ones are the parallel communicating (PC) grammar systems [13]. Language theoretic aspects of grammar systems have been studied extensively during the years: for summaries of the achievements in the field the reader

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