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ON THE POWER OF P SYSTEMS WITH REPLICATED REWRITING

VINCENZO MANCA
Dipartimento di Informatica, Università degli Studi di Pisa
Corso Italia 40, I-56125 Pisa, Italy
e-mail: mancav@di.unipi.it

CARLOS MARTÍN-VIDE
Research Group on Mathematical Linguistics, Rovira i Virgili University
Pl. Imperial Tàrraco 1, E-43005 Tarragona, Spain
e-mail: cmv@astor.urv.es

and

GHEORGHE PĂUN[1]
Institute of Mathematics of the Romanian Academy
PO Box 1-764, R-70700 Bucureşti, Romania
e-mail: gpaun@imar.ro

ABSTRACT

We continue the study of a variant of string-objects P systems recently introduced by KRISHNA and RAMA, namely with the possibility to also replicate the strings when rewriting them. The main result of the paper solves an open problem about such P systems: the hierarchy on the number of membranes collapses, systems with six membranes characterize the recursively enumerable languages. We also investigate the power of systems with less than six membranes, in comparison with the families of matrix languages and of E0L and ET0L languages. We close the paper with some remarks about the closure properties of the families of languages generated by P systems with replicated rewriting. Several open problems are also formulated.

Keywords: membrane computing, P systems, recursively enumerable language, closure property.

1. Introduction

Many classes of P systems with objects described by strings of symbols and processed by rewriting or by other operations were considered, see, e. g., [1, 2, 12, 5, 8, 9, 10, 11, 14] (an up-to-date bibliography of the area can be found at the web address

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