

## A POLYNOMIAL COMPLEXITY CLASS IN P SYSTEMS USING MEMBRANE DIVISION <sup>1</sup>

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### ABSTRACT

In this paper we introduce the complexity class  $\mathbf{PMC}_{\mathcal{F}}$  of all decision problems solvable in polynomial time by a family of P systems belonging to a given class of membrane systems with input,  $\mathcal{F}$ . We show that the problem of determining if a boolean formula in conjunctive normal form is satisfiable belongs to  $\mathbf{PMC}_{\mathcal{AM}}$ , where  $\mathcal{AM}$  is the class of recognizer P systems with input and with active membranes using 2-division. We conclude that the class  $\mathbf{NP}$  is contained in the above mentioned complexity class.

*Keywords:* Membrane computing, P systems, complexity classes, SAT problem

### 1. Introduction

In October 1998 [1] an unconventional model of computation, called *P systems*, is introduced by Gh. Păun within the framework of *Natural Computing*, as a class of distributed parallel computing models. The starting point is the observation that certain processes which take place in the complex structure of living cells can be considered as computations.

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