EVENT-RELATED OUTPUTS
OF COMPUTATIONS IN P SYSTEMS

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ABSTRACT

We briefly investigate the idea to consider as the result of a computation in a P system
the number of steps elapsed between two events produced during the computation.
Specifically, we first consider the case when the result of a computation is defined in
terms of events related to using rules, introducing objects, or meeting objects. In each
case, symport/antiport P systems are computationally complete, i. e., they can generate
any recursively enumerable set of natural numbers. Then, we address the case when
the number computed by a system is the length of a computation itself. We obtain a
few results both for catalytic multiset-rewriting and for symport/antiport systems (in
each case, also with using membrane dissolution) showing that non-semilinear sets of
vectors of natural numbers can be computed in that way. Moreover, we prove a general
result showing that for no type of systems we can obtain computational completeness
when considering the length sets of halting computations. The general problem, of
characterizing the sets of natural numbers computed in this way, remains open.

Keywords: Computational completeness, decidability, P systems