Fuzzy P systems and fuzzy rule-based decisionmaking systems

Adam Obtułowicz
Institute of Mathematics
Polish Academy of Sciences
e-mail: adamo@impan.gov.pl

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Abstract

The application of Petri nets to model rule-based decisionmaking systems, known since late 70s of XX century (cf. [1], [2], [4]), and the relationship of P systems and Petri nets described in [3] give rise to the following conclusion explained in the present lecture and containing the proposals of the future more detailed investigations.

P systems, eventually their modifications or fuzzy counterparts can be used for modelling rule-based decisionmaking by a hierarchically organized system of many single (separate) rule-based decisionmaking systems modelled by Petri nets[1], respectively such that

— the single rule-based decisionmaking systems, belonging to the whole hierarchically organized system are associated to (or placed in) hierarchically organized ambients (or the regions of membranes which form a membrane structure—a tree), respectively,

— the outputs of the single rule-based decisionmaking system associated to an ambient (or placed in the region of a membrane) m may coincide only with some places of the Petri net modelling the single rule-based decisionmaking system associated to an ambient (or a membrane) immediately neighbouring with m, i.e. the ambient immediately containing m or an ambient immediately contained in m.

It seems that it is more natural and less elaborate to formulate the decision rules of such hierarchically organized system in the manner of

[1] where the places and the transitions of Petri nets correspond to decision conditions and decision rules, respectively.

evolution rules of P system and then to transform the obtained P system to an appropriate hierarchically organized system of Petri nets, like in [3], in order to investigate, for instance, reachability problem by using the known methods of Petri net theory.

References

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