the one hand, the FIS can represent systems, a flexible and robust way, their uses within the DEVS formalism has therefore many interests. On the other hand, optimization methods can facilitate the calibration or setting phases, moreover they are used to improve the structure of the FIS: inputs, outputs and rules.

Our approach is simple to use, after selecting the parameters to optimize, it is sufficient to couple, or add optimization models to the structure of a FIS. Several models are available; they are based on different optimization methods, stochastic gradient, genetic algorithms and neural network. Subsequently, other methods will add to enrich the optimization library. In the short term, we wish to propose two extensions to this paper: study the impact of operators and smoothing functions, and a comparison between the several models of optimization. This work enables us to complete our idea of fuzzy toolbox for the DEVS formalism [7]. Subsequently, we will continue our research in the fields of computational intelligence, for example, we work to define an extension of the DEVS formalism for representing Bayesian networks.

References

[1] C.G. Cassandrass and S. Lafortune. Introduction to Discrete Event Systems. 1999.

[2] Feng Lin and Hao Ying. Fuzzy discrete event systems and their observability. In IEEE, editor, Proceedigns of IFSA World Congress and 20th NAFIPS International Conference, Vancouver, (Canada), volume 3, pages 1271 – 1276, 2001.

[3] Bernard P. Zeigler. Theory of Modeling and Simulation. Academic Press, 1976.

[4] Lofti A. Zadeh. Fuzzy logic. Computer, 21(4):83–93, 1988.

[5] E.H. Mamdani and S. Assilian. An experiment in linguistic synthesis with a fuzzy logic controller. International Journal of Man-Machine Studies, (7):1–13, 1975.

[6] T. Takagi and M. Sugeno. Fuzzy indentification of systems and its applications to modeling and control. In IEEE, editor, proceedings in IEEE Trans On S.M.C, 01 1985.

[7] P.-A. Bisgambiglia, E. de Gentili, P.A. Bisgambiglia, and J.-F. Santucci. Fuzz-idevs: Towards a fuzzy toolbox for discrete event systems. In ACM, editor, Proceedings of the SIMUTools'09, Rome (Italie). SIMUTools, 3 2009.

[8] L.A. Zadeh. Fuzzy sets. Information Control, 8:338–353, 1965.

[9] L.A. Zadeh. Fuzzy sets as a basics for a theroy of possibility. Fuzzy Sets and Systems, pages 3–28, 1978.

[10] G. Shafer. A Mathematical Theory of Evidence. 1976.

[11] P.-A. Bisgambiglia, E. de Gentili, P.A. Bisgambiglia, and J.-F. Santucci. idevs: new method to study inaccurate systems. In IEEE, editor, Proceedings of the The Annual IEEE International Conference on Fuzzy Systems, Jeju Island (Korea). IEEE, 8 2009.

[12] P.-A. Bisgambiglia, L. Capocchi, P.A. Bisgambiglia, and S. Garredu. Fuzzy Inference Models For Discrete EVent Systems. In IEEE, editor, Proceedings of the 2010 IEEE World Congress on Computational Intelligence (WCCI 2010) - IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Barcelona (SPAIN). IEEE, 7 2010.

[13] A. Abraham. Evonf: a framework for optimization of fuzzy inference systems using neural network learning and evolutionary computation. In IEEE, editor, Intelligent Control, 2002. Proceedings of the 2002 IEEE International Symposium, number 2, pages 327–332, 02 2002.

[14] Ying-Shen Juang, Shui-Shun Lin, and Hsing-Pei Kao. Design and implementation of a fuzzy inference system for supporting customer requirements. Expert Systems with Applications, 32(3):868 – 878, 2007.

[15] Lee ChangSu Lee, A. Zaknich, and T. Braunl. A framework of adaptive t-s type rough-fuzzy inference systems (arfis). In Proceedings of the 2008 IEEE World Congress on Computational Intelligence (WCCI 2008) - IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), pages 567–574, 06 2008.

[16] S. Sheikh-Bahaei, J. Liu, M. Jamshidi, and P. Lino. An intelligent discrete event approach to modeling, simulation and control of autonomous agents. 10(4):337 – 348, 2004.

[17] Y. Kwon, H. Park, S. Jung, and T. Kim. Fuzzy-DEVS Formalisme : Concepts, Realization and Application. Proceedings AIS 1996, pages 227–234, 1996.

[18] P.Y. Glorennec. Fuzzy Q-Learning and Dynamical Fuzzy Q-Learning. In IEEE, editor, Proceedings of the IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Orlando, USA, page 474, 1994.

[19] T. Presberger and M. Koch. Comparison of evolutionary strategies and genetic algorithms for optimisation of a fuzzy controller. In Proceedings of EUFIT 95 Aachen, Germany, 1995.

[20] T. Kohonen. The self-organizing map. 78:1464 – 1480, 1990.

[21] M. Sugeno and Takahiro Yasukawa. A fuzzy-logic-based approach to qualitative modeling. 1(1):1464 – 1480, 1993.

[22] E. Kilic, C. Karasu, and K. Leblebicioglu. Fault diagnosis with dynamic fuzzy discrete event system approach. 3949:117 – 124, 2005.