EXTENDED DYNAMIC STRUCTURE DEVS

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ABSTRACT
Since the first publication of DEVS, the formalism was enhanced and many extensions have been introduced. Every extension holds some advantages over the other, e.g. Parallel DEVS generalizes the specification and handling of concurrent events, DEVS with Ports enables a more structured modeling and Dynamic Structure DEVS introduces dynamic structure changes at coupled model level during simulation time. The extensions have one joint attribute: they are extending the Classic DEVS formalism and don't incorporate the advantages of each other. Hence, the decision on one DEVS extension inhibits the use of advantages of another one. This lack leads to the idea of a merging formalism to combine the advantages of different approaches. The Extended Dynamic Structure DEVS combines the Classic DEVS with some of the existing extensions: Parallel DEVS, Dynamic Structure DEVS and DEVS with Ports.

Keywords: Discrete Event Simulation, DEVS, DSDEVS, PDEVS, EDSDEVS

Hagendorf, O., Pawletta, T., Pawletta, S., Colquhoun, G., 2006. An approach for modelling and simulation of variable structure manufacturing systems. *Proceeding of the 2006 ICMR* Liverpool, UK

Pawletta, T., Lampe, B.P., Pawletta, S., Drewelow, W., 1996. Dynamic structure simulation based on discrete events. *ASIM-Mitteilungen Nr.53, 9. Workshop Simulation and AI,* p.7-11, Ulm, Germany, 02.1996.

Pawletta, T., Deatcu, C., Pawletta, S., Hagendorf, O., Colquhoun, G., 2006. DEVS-Based Modeling and Simulation in Scientific and Technical Computing Environments *Proceedings of the 2006 Spring Simulation Conference*, Huntsville/AL, USA

Praehofer, H., 1992. *CAST Methods in Modelling*. Pichler, F., Schwärtzel, H. Springer Pub.

Uhrmacher, A.M., Arnold, R., 1994. Distributing and maintaining knowledge: Agents in variable structure environment. *5th Annual Conference on AI, Simulation and Planning of High Autonomy Systems*, p. 178-194

Wainer, G., Giambiasi, N., 2001. Application of the Cell-DEVS paradigm for cell spaces modelling and simulation. *SIMULATION Transactions of The Society for Modeling and Simulation International*, vol. 76, 01.2001

Wainer, G. A., 2009. *DEVS Tools.* Available from: www.sce.carleton.ca/faculty/wainer/standard/tools.htm [Accessed 06.2009]

Zeigler, B.P., 1976 *Theory of Modeling and Simulation.* 1st edition, John Wiley

Zeigler, B.P., Praehofer, H., Kim, T.G., 2000 *Theory of Modelling and Simulation.* 3rd edition, Academic Press

REFERENCES

Barros, F.J., 1996. *Modeling and Simulation of Dynamic Structure Discrete Event Systems: A General Systems Theory Approach.* Thesis (PhD), University of Coimbra

Chi, S.D., 1997. Model-based Reasoning Methodology Using the Symbolic DEVS Simulation *Trans. of SCS*, 14(3): p.141-152

Chow, A.C., Zeigler, B.P., 1994. Parallel Devs: A Parallel, Hierarchical, Modular Modeling Formalism. *Proceedings of the 1994 Winter Simulation Conference*, LakeBuenaVista/FL, USA

Deatcu, C., Pawletta, T., Hagendorf, O., Lampe, B., 2009. Considering Workpieces as Integral Parts of a DEVS Model. *Proceeding of 2009 EMSS - part of I3M Multiconference 2009* Teneriffa, Spain