

The advances in the state of the art of modeling and simulation: Discrete event system specification (DEVS)

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The ‘*Advances in the State of the Art of Modeling and Simulation*’ special issue is in two parts. The first part covers the subject of *hybrid systems modeling*.^{1–3} It comprises five papers published in the preceding issue of the journal.^{4–8} This part includes two additional papers employing discrete event system specification (DEVS) formalism. An overview of the included papers is as follows.

The paper by Cardoen et al.⁹ is on parallel DEVS formalism and on tools that enable the modeling and simulation of parallel DEVS models. In a parallel simulation, synchronization protocols are necessary for the prevention of causality errors. Existing parallel DEVS simulation tools are often limited to a single synchronization protocol (e.g., conservative or optimistic) that restricts their application to only specific problems and application domains. To overcome this limitation, the authors have implemented the *DEVS-Ex-Machina* (“dxex”) parallel DEVS simulator that not only supports both optimistic and pessimistic synchronization protocols, but can also switch protocols at runtime. The paper presents the design and evaluation of the system.

The paper by Goldstein et al.¹⁰ is on the *DesignDEVS* simulation development environment, which is based on the DEVS formalism. The environment is intended for collaborative and multidisciplinary design and model development. One important design characteristic of *DesignDEVS* is that it reinforces the users’ understanding of theoretical principles of DEVS, and as such, its implementation allows for separation of model and simulator and the late coupling of models. Some applications of *DesignDEVS* are also presented.

The ‘*Advances in the State of the Art of Modeling and Simulation*’ special issue comprises papers that were originally submitted to the 2016 edition of the Spring Simulation Multi-Conference (SpringSim’16), held April 3–6 in Pasadena, CA. The winners of the SpringSim’16 Best Paper awards were invited by the guest editors to submit extended versions of their original conference submission. There was also an Open Call for Papers. The review process was rigorous and lasted almost two years.

The guest editors would like to thank the reviewers for taking the time to offer extensive comments, and the authors for their excellent contributions!

Authors’ note

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