



## Discrete-Event Modeling and Simulation Methodologies: Past, Present and Future

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### Resumen:

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At the beginning of the '70s, different research groups around the world started developing M&S methodologies intended to improve the development task of very complex simulation systems. Some of these techniques proved to be successful in providing a sound base for the development of discrete-event simulation models, improving the ease of model definition and enhancing the application development tasks; reducing costs and favoring reuse. These needs are becoming crucial for the current complexity of simulation environments, which include virtual worlds, distributed platforms, and multi-paradigm models interacting in a close fashion. The DEVS formalism is one of these techniques, which proved to be successful in providing means for modeling while reducing development complexity and costs. We will present a historical perspective of discrete-event M&S methodologies, showing different modeling techniques. We will introduce DEVS origins and general ideas, and compare it with some of these techniques. We will then show the current status of DEVS M&S, showing some examples of the current use of DEVS, including applications in different fields (biology, physics, defense, industry, and artificial systems development). We will finally show current open topics in the area, which include advanced methods for centralized, parallel or distributed simulation, the need of real-time modeling techniques, and our view in these fields.

### sobre Gabriel Wainer:

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Gabriel A. Wainer received the degree of M. Sc. in Computer Science (1993) and the Ph.D. degree (1998, with highest honors) of the Universidad de Buenos Aires, Argentina, and Université d'Aix-Marseille III, France. He is Associate Professor at the Dept. of Systems and Computer Engineering, Carleton University Ottawa, Canada (Assistant Professor Jul 2000-Jul 2005). He published over 100 articles in the field of operating systems, real-time systems and discrete-event simulation. Dr. Wainer is author of a book on real-time systems, and one on discrete-event simulation. He is Associate Editor of the Transactions of the SCS, and the International Journal of Simulation and Process Modeling (Inderscience). He also served as member of the IPC of over 40 conferences in the field. He is a Senior member and served four years as a member of the Board of Directors of the Society for Computer Simulation International (SCS). Prof. Wainer is also a co-associate director of the Ottawa Center of the McLeod Institute of Simulation Sciences and a coordinator of an international group on DEVS standardization with over 125 members for the Simulation Interoperability Standards Organization (SISO). He has received numerous grants, scholarships, and awards, including Carleton University's Research Achievement Award (2005-2006).