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The 11th International Multidisciplinary Modeling & Simulation Multiconference

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I3M 2014 Keynote Speakers

Bernie Zeigler, Chief Scientist, RTSync Corporation, Sierra Vista, AZ

How Can DEVS Modeling and Simulation Theory Help Simulationists?
Two ideas about componentized simulations based.on DEVS modeling and simulation theory have immediate implications for all simulationists. Componentized simulations are simulations that are put together from mix and match components. Both ideas relate to how component properties affect the overall simulation. The first idea answers the question that is relevant the wide-spread availability of multi-core technology. What is the fastest you can make a simulation run if you put its components on multiple processors and how many do you need? We explain a simple formula that derives Amdahl's law from distribution of component simulation times and also gives a simple way to estimate how many cores are needed. Another idea relates to components that are reusable in different combinations for which alternatives exist that can be interchanged with them. For example components can be agents with alternative strategies, robots playing soccer positions, models at different levels of abstraction with equivalent behaviors. We discuss a DEVS-based measure of activity for components and how it can be easily employed to rate components and synthesize compositions that are suitable for different objectives.
As a generic simulation formalism, DEVS is applicable in principle to cutting edge problems in numerous areas, To close the talk, I will give practical application examples in different areas including Logistics, Defense, and Healthcare, where DEVS-based tools offer help to all simulationists.

Bernard P Zeigler is Emeritus Professor of Electrical and Computer Engineering at the University of Arizona and Adjunct Research Professor in the C4I Center at George Mason University. He is internationally known for his seminal contributions in modeling and simulation theory and has published several books including "Theory of Modeling and Simulation" and "Guide to Modeling and Simulation of Systems of Systems. " He was named Fellow of the IEEE for the Discrete Event System Specification (DEVS) formalism that he invented in 1976. Among numerous positions held with the Society for Modeling and Simulation International (SCS) he served as President and was inducted into its Hall of Fame. He is currently Chief Scientist with RTSync Corp., a developer of the MS4 modeling and simulation software based on DEVS. Zeigler's research has been funded by a variety of sponsors including National Science Foundation (NSF), Defense Advanced Reseach Projects Agency, US Air Force Research Laboratory among others. For more information see the Wikipedia entry on Bernard P Zeigler.

Janos Sebestyen JANOSY, Atomic Energy Research Institute, Hungary

Smartgrid, the intelligent energy distribution network
We are living with networks surrounding us. The first such network was probably the postal services, and now the youngsters are already using 4G mobile internet.
Megawatts and gigawatts are not so easy to handle than megabytes and gigabytes. Transferring huge amounts of electrical energy requires big investments. The story started at the end of the 19th century with steam engines, generating power first for the factories, later for the settlements of the workers, moving close to the big industrial centres. Connecting those resulted in national grids available at least for the urbanized areas. It may sound strange, but the consumption habits have changed very little during the last 120 years.

There is a meter outside the house and anybody can draw any time as much energy as he/she pleases. All this happening with fixed prices not depending upon the actual state of the supply and the demand - which is rather strange nowadays.
The events on 11th of Sept. 2001 taught us that we are vulnerable even at home. The 2003 big blackout lasting four days on the east coast of USA and causing huge damages and losses implied that something has to be done: it should not happen any more. We already know from the information technology: networks should be redundant, diverse, distributed, hierarchically built, self-diagnosing and self-healing in order to be able to provide robust and reliable service. How to achieve that?
On the other hand, the unpredictable and renewable energy resources are growing very rapidly. Photovoltaic cells, wind turbines, biogas, etc. They are relatively small, but very numerous and they cannot be handled efficiently in the old-fashioned centralized way. We need local energy storage as much as possible to cover periods of time when the sun is down and the wind is not blowing. That implies that customers have to be smart, more intelligent to optimize the various possibilities in the environment of new, fast-changing flexible electricity tariffs.
Different countries are in different situation, depending upon the different history and levels of development. There is no common approach to improve. There will be different ideas, different methods presented and compared in a relatively easy understandable way. This is where our knowledge and experience steps in: simulation. Experimenting with big power is expensive, but the modeling is straightforward and reliable, and different approaches can be worked out relatively easy and this should not last very long periods of time.

Janos Sebestyen JANOSY is working for the Atomic Energy Research Institute which became part of the Centre for Energy Research of the Hungarian Academy of Sciences since 2012. He is a Senior Researcher since 1974, former Head of the Simulator Development Department 1994-2011, Senior Consultant to the Technical and Scientific Support Organization since 2012. He is registered by the Hungarian Chamber of Engineers as an Official Expert in thermohydraulics, machinery, instrumentation & control for nuclear power plants. He got his "Honorary Life Fellow" title from the United Kingdom Simulation Society (UKSim) in 2013.
J.S. Janosy has published several scientific publications in international journals and conferences. His main scientific interests: modeling and simulation, real-time simulation and simulators, nuclear, fossil and renewable energy production, energy distribution, instrumentation and control, smart electrical grids and energy storage.
He participated, and later managed several industrial projects connected to the mentioned topics. He is married with two grown-up married daughters, having three grandchildren. He is a Ham Radio operator (radio amateur) since 1965, active on short-wave bands with call sign HA5GN. He is active in shooting sports.

Yves Ducq – Head of Production engineering research group, University of Bordeaux, France

An exhaustive overview and comparisons of Performance Measurement Methods before simulation: from the past to the definition of a generalised framework
The domain of enterprise uses a lot of different type of performance indicators based on different kinds of models. These indicators aim to measure the performance during the design of the system by simulation or during the exploitation by performance measurement.
At the national and international levels, there are more than 35 existing methods to define and to implement performance indicator systems that can then be used for simulation.
These methods were defined by academics and practitioners based on theories and mainly on their experience of performance management.
This presentation aims at presenting first an exhaustive review of these existing methods. A focus is done on Balanced Score card and ECOGRAI that are based on enterprise models. In a second time, the 35 existing methods are compared and a generalized framework for such methods is presented. This generalized framework is also based on GERAM (Generalised Enterprise Reference Architecture and Methodology) that was carried out in the domain of enterprise modelling methods. This generalized framework aims to define which modules a method dedicated to performance indicator system definition and implementation must contain.

Yves DUCQ is full Professor at University of Bordeaux. Yves Ducq is Doctor from University Bordeaux 1 in Production Management and Enterprise Modelling. He received his PhD degree at the “Laboratoire d’Automatique et de Productique “(LAP) of University Bordeaux 1. He received his Accreditation to Supervise Research in 2007.
He is working on Performance Measurement, Enterprise Modelling and Production Management since twenty years and has published more than 20 papers in books and international journals and more than 80 papers in international conferences.
He has been involved on several European projects for twenty years and

particularly in the frame of IMS - GLOBEMAN 21 (FP4), Growth – EUROSHOE, IST – CENNET (cooperation with China) and IST - UEML of the FP5. He was strongly involved in INTEROP Network of Excellence, in particular in the management of the researcher mobility programme and is member of the virtual laboratory on interoperability: INTEROP Vlab. He is strongly involved in FP7-MSEE and FP7-FITMAN. He has also act as research engineer on several contracts with industry on performance improvement.
He was Quality Manager for the University of Bordeaux 1 and Quality representative for the University of Bordeaux.

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