



Call ASIM Special Session

Physical Modelling, Control and Model Exchange

Thursday, September 9, 2010 – Friday, September 10, 2010

Physical Modelling is a fast-growing area of modelling and simulation that provides a structured, computer-supported way of doing mathematical equation-based and graphical modelling. With a fast increasing amount of software providers as well as users Physical Modelling is becoming the state-of-the-art for object-oriented component-based modelling of complex physical systems. The physical modelling approach includes several benefits:

- Multi-domain modelling (e.g., mixing electrical, hydraulic, and mechanical systems)
- Visual a-causal component modelling (enables rapid prototyping)
- No need for explicit state spaces – neither textual nor at graphical modelling level
- A-causal modelling on DAE basis

In combination with classical continuous and with classical and advanced control models and control algorithms Physical Modelling shows a lot of strength:

- Hybrid modelling (combining continuous-time and discrete-time modelling)
- Advanced constructs for modelling control (state automata, DEVs)
- Real Time control with continuous / discrete elements, etc.

Physical modelling and A-causal Modelling has been initiated and is still driven by two new modelling standards, by Modelica and VHDL-AMS. As consequence, Physical Modelling provides a new basis for model exchange and model re-use at a very high modelling level with the following benefits:

- standardized multi-domain modelling at component basis
- simulator – independent modelling by using the standards
- model exchange and model re-use between different simulation systems, etc.

The EUROSIM 2010 Special Session ***Physical Modelling, Control and Model Exchange*** addresses in application development, tool development and in theory all aspects of Physical Modelling and A-causal Modelling and examines the new possibilities in the combination of Physical Modelling with Control and investigates new features for Model Exchange.

In the following an (incomplete) list of aspects in Physical Modelling is given, which should be discussed in this Special Session:

- Applications of Physical Modelling in all kind of Engineering
- Modelica or VHDL-AMS Modelling applications
- Modelica / VHDL-AMS Modelling Libraries
- Modeling of Multidomain Physical Systems
- Combining Control Modelling and Physical Modelling – applications, tools, and approaches and theory
- Model exchange on different levels (Modelica, C, java)
- Co-Simulation for combination of different modelling approaches with Physical Modelling
- Symbolical and numerical algorithms for simulation in Physical Modelling (state space translation, index reduction, dae solvers, state event mechanisms, etc.)
- Hybrid modelling combined with Physical Modelling – applications, tools, theory
- Discrete features in Modelica / VHDL-AMS (events, state automata, Petri nets, ..)
- Real-time modelling and simulation based on Physical Modelling

And last but not least we invite to contribute to this special session also by critical contributions stressing questions like modelling overhead using Physical Modelling, code efficiency of derived models, contradiction to real-time demands, etc.

Organisation of the Session.

Contributors are invited to submit a contribution with extended abstract (2 pages, pdf format) by email to one of the session organisers or directly or via ASIM webserver in time, at latest May 3, 2010). Session organisers will take care on proper peer review and will send notification of acceptance until May 15, 2010.

For Publication and presentation the following options are available:

- Printed Proceedings Abstract, Full Paper at Proceedings CD, Oral Presentation
- Printed Proceedings Abstract, Short Paper at Proceedings CD, Oral Presentation
- Printed Proceedings Abstract, Oral Presentation
- Only Oral Presentation

The oral presentation of the Special Sessions organised by ASIM, 'Advanced and Comparative Approaches in Modelling and Simulation' and 'Physical Modelling, Control and Model Exchange' are scheduled for Thursday, September 9, 2010, 10.00 – 17.00, and Friday, September 10, 2010, 9.00 – 13.00.

Final versions of the accepted contributions with publication in Proceedings have to follow the submission guidelines and formatting guidelines (see EUROSIM 2010 homepage www.eurosim2010.org), upload until June 15, 2010.

Session organizers:

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Submission also directly via ASIM webserver www.asim-gi.org, quick link EUROSIM 2010

Summary

Physical Modelling, Control and Model Exchange

Chairs: Ingrid Bausch-Gall, Simulation and Computer-aided Engineering, Munich

Peter Schwarz, Fraunhofer Dresden

Felix Breiteneker, Vienna University of Technology

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Abstract: Physical Modelling is a fast-growing area of modelling and simulation that provides a structured, computer-supported way of doing mathematical equation-based and graphical modelling. With a fast increasing amount of software providers as well as users Physical Modelling is becoming the state-of-the-art for object-oriented component-based modelling of complex physical systems and – in combination with advanced control modelling – it opens a new area in modelling a simulation, allowing e.g. model exchange at a high level. The EUROSIM 2010 Special Session **Physical Modelling, Control and Model Exchange** addresses any kind of contribution dealing with development of Physical Modelling and with Physical Modelling in the context with Control Modelling and Model Exchange. The subjects may range from Modelica Modelling in practice and theory via hybrid structures in physical modelling until real-time problems in Physical Modelling and modelling libraries. Details see pdf Call.

Session Deadline: May 3, 2010 – submission of 2-page pdf extended abstract via email to one of the sessions organisers or directly at ASIM webserver www.asim-gi.org (quick link EUROSIM 2010)

Notification of Acceptance: May 15, 2010

Camera Ready Papers: June 15, 2010

Submission guidelines: Please send a 2-page extended abstract (pdf) via email to one of the session organisers (no special formatting guidelines) or submit directly or at ASIM webserver: ingrid.bausch-gall@bausch-gall.de, thorsten.pawletta@hs-wismar.de, felix.breiteneker@tuwien.ac.at, pb.schwarz@web.de; www.asim-gi.org – quick link 'EUROSIM 2010 submission'

Review process: Each contribution will be reviewed by at least two reviewers.