Controls

Electrical

Systems

Tools

PROGRAM
of the

9th
INTERNATIONAL
MODELICA
CONFERENCE

September 3-5, 2012
Munich, Germany
www.modelica.org

Editors:
Martin Otter
Dirk Zimmer

MODELICA

Fluids

Mechanical

Program of the 9th International Modelica Conference
Munich, Germany, September 3-5, 2012

Editors:
Prof. Dr.-Ing. Martin Otter and Dr. Dirk Zimmer (DLR-RMC-SR)

Conference location:
Veranstaltungsforum Fürstenfeld,
Fürstenfeld 12
D-82256 Fürstenfeldbruck
Germany

Welcome

The 9th International Modelica Conference is the main event for users, library developers, tool vendors and language designers to share their knowledge and learn about the latest scientific and industrial progress related to Modelica, to the Modelica Association and to the Functional Mockup Interface. Highlights of the conference:

- **80 regular** papers, **22 poster** papers, and **6 libraries** for the Modelica Library Award.

- **2 Keynotes**.

- **8 tutorials** (3.5 hours each, descriptions).

- **10 vendor sessions** (45 min. each) where the latest news of Modelica and FMI tools are presented.

- **17 exhibitors** in the exhibition area.

Please note that to some of the papers a Modelica library or model is attached. These files are accessible in the electronic proceedings.

The conference provides also the most important news from the Modelica Association:

- The new version of the Modelica language version 3.3 was released on May 9, 2012. There are several papers and a tutorial at the conference that discusses and demonstrates the new features.

- The working process of the Modelica Association has been changed and the work is now organized in Modelica Association Projects (MAP) with an extended board. More details are given in the presentation "Modelica News" on Tuesday, September 4, 9:10 – 9:25.

- The further development of the FMI (Functional Mockup Interface) standard is performed in a MAP. A draft version of FMI 2.0 will be available before the conference. An overview of this new version is given in a conference paper. In two sessions, applications and tool support for FMI are presented and discussed.

- Since July, the Modelica Association provides an open source FMI compliance checker for FMI 1.0 at https://svn.fmi-standard.org/fmi/trunk/Test_FMUs. Its purpose is to check exported FMUs for validity. The checker can also produce reference simulation results with a fixed step explicit Euler method. Shortly after FMI 2.0 is released, the compliance checker will also be available for FMI 2.0.

Finally, we want to acknowledge the support we received from the program board and program committee. We are grateful for the help by the Modelica Association and Monika Klauer from DLR. Last but not least, let us thank all authors for their contributions to this conference.

We wish all participants an enjoyable and successful conference.

Weßling, July 20, 2012

Martin Otter and Dirk Zimmer

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General Schedule of Monday, September 3

14:00 17:45	**Tutorials**

Tenne

17:50 21:00	**Opening Concert** Welcome Reception and Dinner Buffet

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09:10		**Modelica News**			
09:25		**Keynote 1**			
10:10	Coffee Break				
10:40	Exhibition	Hybrid Modelling	Thermofluid Systems	Power and Energy	Electromagnetic Systems I
12:20	Lunch				
13:35	Exhibition	FMI Standard I	Numerical Methods	Climate Systems I	Mechanic Systems I
15:15	Coffee Break				
15:45	Exhibition	Mixed Simulation Techniques I	Embedded and Real-Time Systems	Language and Compilation Concepts I	Mechanic Systems II
17:00	Coffee Break				
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General Schedule of Wednesday, September 5

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09:20	Exhibition	Language and Compilation Concepts II	Control	Handling Simulation Output	Electromagnetic Systems II
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10:40	Exhibition	Simulation Tools	Mixed Simulation Techniques II	Automotive Systems	Power Plants
11:55			**Poster Session**		
12:55	Lunch				
14:00	Exhibition	Optimization Methods	Mechanic Systems III	Climate Systems II	FMI Standard II
15:40					
15:45		**Final Assembly Library Awards**			
16:00					
16:30	Visit at DLR				
19:00					

Scientific Program of Tuesday, September 4, Part I

Stadtsaal	Kleiner Saal	Säulensaal	Seminarraum S1
09:00 **Opening**			
09:10 **Modelica News**			
Keynote 1 Chair: Martin Otter			
09:25 From Concept to Embedded Code – Advanced Modelica Applications in Aerospace and E-Mobility *Dr. Johann Bals*			
10:10			

Hybrid Modeling Chair: Andreas Uhlig	**Thermofluid Systems** Chair: Hubertus Tummescheit	**Power and Energy** Chair: John Batteh	**Electromagnetic Systems I** Chair: Christoph Clauß
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11:05 A Library for Synchronous Control Systems in Modelica *Martin Otter, Bernhard Thiele and Hilding Elmqvist*	HelmholtzMedia - A Fluid Properties Library *Matthis Thorade and Ali Saadat*	Model Library of Polymer Electrolyte Membrane Fuel Cells for System Hardware and Control Design *Kevin L Davies, Robert M. Moore and Guido Bender*	Magnetic Hysteresis Models for Modelica *Johannes Ziske and Thomas Bödrich*
11:30 State Machines in Modelica *Hilding Elmqvist, Fabien Gaucher, Sven Erik Mattsson and Francois Dupont*	Object-Oriented Library of Switching Moving Boundary Models for Two-phase Flow Evaporators and Condensers *Javier Bonilla, Luis J. Yebra, Sebastián Dormido and François E. Cellier*	The Modeling of Energy Flows in Railway Networks using XML-Infrastructure Data *Andreas Heckmann and Sebastian Streit*	Motor Management of Permanent Magnet Synchronous Machines *Anton Haumer and Christian Kral*
11:55 PNlib - An Advanced Petri Net Library for Hybrid Process Modelling *Sabrina Proß and Bernhard Bachmann*	High-Speed Compressible Flow and Gas Dynamics *Michael Sielemann*	Implementation of a Modelica Library for Energy Management based on Economic Models *Dirk Zimmer and Daniel Schlabe*	An Approach for Modelling Quasi-stationary Magnetic Circuits *Nick Raabe*

Scientific Program of Tuesday, September 4, Part II

	Stadtsaal	Kleiner Saal	Säulensaal	Seminarraum S1
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14:00	Generation of Sparse Jacobians for the Function Mock-Up Interface 2.0 *Johan Åkesson, Willi Braun, Petter Lindholm and Bernhard Bachmann*	Probability-One Homotopy for Robust Initialization of Differential-Algebraic Equations *Michael Sielemann*	Holistic Vehicle Simulation - An application on thermal managament and operation strategy *Claude Bouvy, Sidney Baltzer, Peter Jeck, Jörg Gissing, Thomas Lichius, …*	Predicting the Launch Feel of Automatic and Dual Clutch Transmissions *Neil Roberts and Mike Dempsey*
14:25	Designing Models for Online Use with Modelica and FMI *Pål Kittilsen, Svein Olav Hauger and Stein O. Wasbø*	Simulating Modelica Models with a Stand-Alone Quantized State Systems Solver *Federico Bergero, Xenofon Floros, Joaquín Fernández, Ernesto Kofman, …*	Modelling of Radiative Heat Transfer in Modelica with a Mobile Solar Radiation Model and a View Factor Model *Arnav Pathak, Victor Norrefeldt and Gunnar Grün*	Modelling of Elastic Gearboxes Using a Generalized Gear Contact Model *Franciscus van der Linden*
14:50	Co-simulation with Communication Step Size Control in an FMI Compatible Master Algorithm *Tom Schierz, Martin Arnold and Christoph Clauss*	Fast Simulation of Fluid Models with Colored Jacobians *Willi Braun, Stephanie Gallardo Yances, Kilian Link and Bernhard Bachmann*	VEPZO – Velocity Propagating Zonal Model for the prediction of airflow pattern and temperature distribution … *Victor Norrefeldt and Gunnar Grün*	Revised and Improved Implementation of the Spur Involute Gear Dynamical Model *Ivan Kosenko and Ilya Gusev*
15:15				

Scientific Program of Tuesday, September 4, Part III

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15:45	Accessing External Data on Local Media and Remote Servers Using a Highly Optimized File Reader Library *Jörg Rädler, Manuel Ljubijankic, Christoph Nytsch-Geusen and Jörg Huber*	Functional Development with Modelica: A Use-Case Analysis *Stefan-Alexander Schneider and Tobias Hofmann*	Implementation of a Graphical Modelica Editor with Preserved Source Code Formatting *Tobias A. Mattsson, Jon Sten, Tove Bergdahl, Jesper Mattsson …*	Modelling and Simulation of the Coupled Rigid-flexible Multibody Systems in Mworks *Xie Gang, Zhao Yan, Zhou Fanli and Chen Liping*
16:10	Detailed Geometrical Information of Aircraft Fuel Tanks Incorporated into Fuel System Simulation Models *Ingela Lind and Alexandra Oprea*	Translating Modelica to HDL: An Automated Design Flow for FPGA-based Real-Time Simulations *Christian Köllner, Torsten Blochwitz and Thomas Hodrius*	Model-based Requirement Verification: A Case Study *Feng Liang, Wladimir Schamai, Olena Rogovchenko, Sara Sadeghi, …*	A Modelica Library of Anisotropic Flexible Beam Structures for the Simulation of Composite Rotor Blades *Christian Spieß and Manfred Hajek*
16:35	Simulation of Artificial Intelligence Agents using Modelica and the DLR Visualization Library *Alexander Schaub, Matthias Hellerer and Tim Bodenmüller*	A Modelica Library for Real-Time Coordination Modeling *Uwe Pohlmann, Stefan Dziwok, Julian Suck, Boris Wolf, Chia Choon Loh, …*	A Data-Parallel Algorithmic Modelica Extension for Efficient Execution on Multi-Core Platforms *Mahder Gebremedhin, Afshin Hemmati Moghadam, Peter Fritzson, …*	Modeling and Simulation of a Fault-Tolerant Electromechanical Actuation System for Helicopter Swashplates … *Sebastian Seemann and Clemens Schlegel*
17:00				

Scientific Program of Wednesday, September 5, Part I

	Stadtsaal	Kleiner Saal	Säulensaal	Seminarraum S1
08:30 09:15	**Keynote 2** Chair: Martin Otter Modelica - Quo vadis? *Prof. Karl Johan Åström*			
	Language and Compilation Concepts II Chair: Sven-Erik Mattsson	**Control** Chair: Hilding Elmqvist	**Handling Simulation Output** Chair: Chris Paredis	**Electromagnetic Systems II** Chair: Anton Haumer
09:20	Survey of Appropriate Matching Algorithms for Large Scale Systems of Differential Algebraic Equations *Jens Frenkel, Günter Kunze and Peter Fritzson*	A Modelica Sub- and Superset for Safety-Relevant Control Applications *Bernhard Thiele, Stefan-Alexander Schneider and Pierre R. Mai*	Modelica3D - Platform Independent Simulation Visualization *Christoph Höger, Alexandra Mehlhase, Christoph Nytsch-Geusen, …*	Towards a Memristor Model Library in Modelica *Kristin Majetta, Christoph Clauß and Torsten Schmidt*
09:45 10:10	Static and Dynamic Debugging of Modelica Models *Adrian Pop, Martin Sjölund, Adeel Asghar, Peter Fritzson, Francesco Casella*	A Modelica Library for Industrial Control Systems *Marco Bonvini and Alberto Leva*	Proposal for a Standard Time Series File Format in HDF5 *Andreas Pfeiffer, Ingrid Bausch-Gall and Martin Otter*	Fault Detection of Power Electronic Circuit using Wavelet Analysis in Modelica *Jianbo Gao, Yang Ji, Johann Bals and Ralph Kennel*
	Simulation Tools Chair: Dirk Zimmer	**Mixed Simulation Techniques II** Chair: Bernhard Bachmann	**Automotive Systems** Chair: Rui Gao	**Power Plants** Chair: Daniel Bouskela
10:40	PySimulator – A Simulation and Analysis Environment in Python with Plugin Infrastructure *Andreas Pfeiffer, Matthias Hellerer, Stefan Hartweg, Martin Otter, Matthias Reiner*	Using BCVTB for Co-Simulation Between Dymola and MATLAB for Multi-Domain Investgations of Production Plants *Irene Hafner, Matthias Rössler, Bernhard Heinzl, Andreas Körner, …*	Development of New Concept Vehicles Using Modelica and Expectation to Modelica from Automotive Industries *Yutaka Hirano*	Status of ClaRaCCS: Modelling and Simulation of Coal-Fired Power Plants with CO2 Capture *Johannes Brunnemann, Friedrich Gottelt, Kai Wellner, Ala Renz, André Thüring, …*
11:05	An OpenModelica Python Interface and its use in PySimulator *Anand Kalaiarasi Ganeson, Peter Fritzon, Olena Rogovchenko, Adeel Asghar, …*	FEM models in System Simulations using Model Order Reduction and Functional Mockup Interface *Andreas Gödecke, Monika Mühlbauer, Jörg Nieveler, Iason Vittorias …*	A Modular Technique for Automotive System Simulation *Felix Günther, Georg Mallebrein and Heinz Ulbrich*	Start-up Optimization of a Combined Cycle Power Plant *Alexandra Lind, Elin Sällberg, Stéphane Velut, Stephanie Gallardo Yances, …*
11:30 11:55	WebMWorks: A General Web-Based Modeling and Simulation Environment for Modelica *Liu Qi, Xiong Tifan, Liu Qinghua and Chen Liping*	Using Modelica models for Driver-in-the-loop simulators *Mike Dempsey, Garron Fish and Alessandro Picarelli*	Modeling Vehicle Drivability with Modelica and the Vehicle Dynamics Library *John Griffin, John Batteh and Johan Andreasson*	Modeling and Simulation of a Vertical Wind Power Plant in Dymola/Modelica *Joel Petersson, Pär Isaksson, Hubertus Tummescheit and Johan Ylikiiskilä*

Scientific Program of Wednesday, September 5, Part II

	Stadtsaal	Kleiner Saal	Säulensaal	Seminarraum S1
11:55		**Poster Session** See list of posters on the next page		
12:55				
	Optimization Methods Chair: Michael Tiller	**Mechanic Systems III** Chair: Martin Otter	**Climate Systems II** Chair: Francesco Casella	**FMI Standard II** Chair: Johan Åkesson
14:00	First and Second Order Parameter Sensitivities of a […] Non-stationary Biochemical Network Model *Ralf Hannemann-Tamás, Jana Tillack, Moritz Schmitz, Jutta Wyes, …*	A Planar Mechanical Library for Teaching Modelica *Dirk Zimmer*	Discontinuous Individual Channel Injection into Fin-and-Tube Evaporators for Residential Air-Conditioning *Martin Ryhl Kærn and Brian Elmegaard*	FMI Implementation in LMS Virtual.Lab Motion and Application to a Vehicle Dynamics Case *Hunor Erdélyi, William Prescott, Stijn Donders and Jan Anthonis*
14:25	Collocation Methods for Optimization in a Modelica Environment *Fredrik Magnusson and Johan Åkesson*	DyMoRail: A Modelica Library for modelling railway buffers *Elisabeth Dumont and Werner Maurer*	Validation and Application of the Room Model of the Modelica Buildings Library *Thierry Stephane Nouidui, Kaustubh Phalak, Wangda Zuo, Michael Wetter*	Generating Functional Mockup Units from Software Specifications *Uwe Pohlmann, Wilhelm Schäfer, Hendrik Reddehase, …*
14:50	Parallel Multiple-Shooting and Collocation Optimization with OpenModelica *Bernhard Bachmann, Lennart Ochel, Vitalij Ruge, Mahder Gebremedhin, …*	Natural Frequency Analysis of Modelica Powertrain Models *Garron Fish, Mike Dempsey, Juan Gabriel Delgado and Neil Roberts*	The Indoor Climate Library and its Application to Heat and Moisture Transfer in a Vehicle Cabin *Victor Norrefeldt, Daniel Andersson, Arnav Pathak, Hubertus Thummescheit*	Functional Mock-up Interface in Mechatronic Gearshift Simulation for Commercial Vehicles *Andreas Abel, Torsten Blochwitz, Alexander Eichberger, Peter Hamann …*
15:15	Optimization Library for Interactive Multi-Criteria Optimization Tasks *Andreas Pfeiffer*	Achieving O(n) Complexity for Models from Modelica.Mechanics.Multibody *Christian Schubert, Jens Frenkel, Günter Kunze and Michael Beitelschmidt*	Dynamic modelling of a Condenser/ Water Heater with the ThermoSysPro Library *Baligh El Hefni and Daniel Bouskela*	Using Functional Mock-up Units for Nonlinear Model Predictive Control *Manuel Gräber, Christian Kirches, Dirk Scharff and Wilhelm Tegethoff*
15:40				
15:45	**Final Assembly** Library Awards			

List of Posters

Modeling a Low-temperature Compressed Air Energy Storage with Modelica *Marcus Budt, Daniel Wolf and Roland Span*	A Toolchain for Real-Time Simulation using the OpenModelica Compiler *Niklas Worschech and Lars Mikelsons*	Modeling a Drum Motor for Illustrating Wearout Phenomena *Olaf Enge-Rosenblatt, Christian Bayer and Joachim Schnüttgen*	Modeling of a Falling Film Evaporator *Alberto de La Calle, Luis J. Yebra and Sebastián Dormido*
Natural Unit Representation in Modelica *Kevin L. Davies and Christiann J. J. Paredis*	Time Varying Mass and Inertia in Paper Winding Multibody Simulation *Edo Drenth*	"Green Building" – Modelling renewable building energy systems and electric mobility concepts using Modelica *René Unger, Torsten Schwan, Beate Mikoleit, Bernard Bäker, ...*	Integration of Modelica Models into an Existing Simulation Software using FMI for Co-Simulation *Matthias Pazold, Sebastian Burhenne, Jan Radon, Sebastian Herkel, ...*
Modelica Code Generation with Polymorphic Arrays and Records Used in Wind Turbine Modeling *Roland Samlaus, Peter Fritzson, Adam Zuga, Michael Strobel, ...*	Collaborative Complex System Design Applied to an Aircraft System *Eric Thomas, Michel Ravachol, Jean Baptiste Quincy and Martin Malmheden*	High-Fidelity Transmission Simulation for Hardware-in-the-Loop Applications *Orang Vahid and Paul Goossens*	Chemical Process Modeling in Modelica *Ali Baharev and Arnold Neumaier*
Derivative-free Optimization of Large Scale Dynamic Models *Sofia Gedda, Christian Andersson, Johan Åkesson and Stefan Diehl*	Backward simulation - A tool for designing more efficient mechatronic systems *Matthias Liermann*	ADGenKinetics: An Algorithmically Differentiated Library for Biochemical Networks Modeling via ... *Atiyah Elsheikh*	FMI Add-on for NI VeriStand for HiL Simulation *Cosimo Palma and Marco Romanoni*
Stochastic Simulation and Inference using Modelica *Gregory Provan and Alberto Venturini*	Modelling of new vehicle suspension concept with integrated electric drive *Jakub Tobolar, Jakob Müller and Alfred Pruckner*	Variable Structure Modeling for Vehicle Refrigeration Applications *Imke Krüger, Alexandra Mehlhase and Gerhard Schmitz*	Using Static Parametric Design to Support Systems Engineering of Industrial Automation Systems *Hongchao Ji, Lars Mikelsons, Karl Kempf and Dieter Schramm*
	Dynamic Modeling and Simulation of a Multi-effect Distillation Plant *Lidia Roca, Luis J. Yebra, Manuel Berenguel and Alberto de La Calle*	Thermal Simulation of Power-Controlled Micro-CHP Systems for Residential Buildings *Sebastian Stinner and Dirk Müller*	

Program of the Vendor Session on Tuesday, September 4

	Stadtsaal	Kleiner Saal	Säulensaal	Seminarraum S1	Seminarraum S5
	ITI GmbH	**Modelon AB**	**Open Source Modelica Consortium**	**QTronic GmbH**	**DeltaTheta**
17:30	SimulationX *Alex Magdanz*	Modelica Libraries from Modelon *Hubertus Tummescheit, Daniel Andersson and John Griffin*	OpenModelica *Peter Fritzson*	Model-based system development with Silver and TestWeaver *Jakob Mauss*	DelthaTheta SDK, Vertex, Converge *Peter Harman*
	Dassault Systèmes	**Maplesoft Europe GmbH**	**Wolfram**	**JModelica.org**	**Fraunhofer IWES**
18:15	Dymola *Hilding Elmqvist and Marc Frouin*	MapleSim *Paul Goosens and Chad Schmidtke*	Wolfram System Modeler *Jan Brugard*	JModelica and related tools *Johan Åkesson, Tove Bergdahl and Christian Andersson*	OneModelica & OneWindStudent *Michael Strobel, Roland Samlaus and Adam Zuga*

Tutorials

The tutorials are free and take place on Monday, 14:00 – 17:45.

Tutorial 1 (Room: Fürstenfelder 2/3):

Introduction to Modeling, Simulation, and Parallel Computing with Modelica using OpenModelica

by Peter Fritzson, Olena Rogovchenko, Martin Sjölund, Mahder Gebremedhin, Kristian Stavåker, Linköping University, Sweden

The first part of the tutorial gives an introduction to the Modelica language to people who are familiar with basic programming concepts. It gives a basic introduction to the concepts of modeling and simulation, as well as the basics of object-oriented component-based modeling for the novice, and an overview of modeling and simulation in a number of application areas. The second part presents methods how multi-core computational power can be used for efficient simulation of Modelica models. This includes automatic parallelization of equation-based models, coarse grained explicit parallelization, and execution on GPUs. Depending on the attendees the two parts are presented in parallel or in subsequence. The OpenModelica environment with its graphical user interface and scripting will be used for hands-on exercises.

Tutorial 2 (Room Stadtsaal)**:**

Mathematical Aspects of Modeling and Simulation with Modelica

by Bernhard Bachmann, University of Applied Sciences Bielefeld, Germany

The object-oriented modeling language Modelica provides powerful features that make it possible to build up and simulate very complex even hybrid systems quite easily. But, what happens, if a Modelica tool is not capable to compile and/or correctly simulate the system of interest? Reasons can be i.e. modeling errors, wrong parameter values and/or numerical instabilities. Automatic problem detection is usually not possible and only understanding of symbolical and numerical techniques behind the scene can help resolving this issue. This tutorial provides a basic understanding on the mathematical aspects of object-oriented modeling and simulation. The different phenomena are explained in detail using simple Modelica examples, which can be thoroughly analyzed during hand-out exercises.

Tutorial 3 (Room: Kleiner Saal):
Synchronous Controllers and State Machines in Modelica 3.3
by Hilding Elmqvist, Sven Erik Mattsson, Dassault Systèmes, Sweden, and Martin Otter, Bernhard Thiele, DLR, Germany

Modelica has been extended with synchronous constructs for describing discrete-time controllers as well as state machines for sequential control and hybrid system modeling. Much focus has been given to safe constructs and intuitive and well-defined semantics. The tutorial will introduce the new concepts of Modelica 3.3 and give plenty of examples on how to use them in practice. The principles of partitioning a system model into different clocks (continuous, periodic, non-periodic, multi-rate) will be explained. Parallel and hierarchical state machines will be introduced including submodels within states. The supporting Modelica library will be described and how mapping to various hardware platforms, for hardware-in-the-loop simulation and embedded control, is performed. Hands on exercises, using Dymola, will give the participants a more detailed understanding of the power of the new features for synchronous controllers and state machines.

Tutorial 4 (Room: Seminarraum S1):
Vehicle Dynamics Library Tutorial
by John Griffin and Johan Andreasson, Modelon AB, Sweden

This tutorial session will allow attendees to be introduced to the capabilities of Dymola and the Vehicle Dynamics Library (VDL). Attendees will have the opportunities to walk-through the library. The benefits of Modelica-based tools will be highlighted through guided, hands-on example experiments. These examples will demonstrate how Dymola/VDL can be successfully used at any phase of the vehicle design process with experiments ranging from the vehicle component to the system level.

Tutorial 5 (Room: Säulensaal):
Dynamic Optimization and FMI Simulation with JModelica.org
by Johan Åkesson and the JModelica.org team, Modelon AB, Sweden

Dynamic optimization is becoming a standard industrial technology to solve a wide range of industrial engineering problems. These include optimal control and model predictive control, model calibration and state estimation as well as design and sizing problems. In this tutorial, participants will get hands on experiences with formulating and solving engineering problems where simulation based on the FMI standard, dynamic optimization based on the Optimica extension and Python scripting are used as building blocks. During the tutorial, we will also discuss challenges and pitfalls in optimization of industrial processes, and we highlight modeling considerations for dynamic optimization. The open source platform JModelica.org is used in the tutorial.

Tutorial 6 (Room: Fürstenfelder 4):
Advanced Analysis of Modelica Models using MapleSim and Maple
by Orang Vahid, Maplesoft, Canada

Since its inception, Modelica has held the promise of letting engineers go further with physical modeling than just running simulations. With recent developments in MapleSim and Maple, users can create and document their own symbolic and numeric analyses of Modelica models in a rich problem-solving environment, in addition to performing traditional simulations.

This tutorial will guide you through the process of loading a Modelica model into Maple and then extracting the model equations into a form amenable to a wide range of analysis. Through hands-on exercises, it will provide you with basic skills in developing your own analyses in Maple, and implementing the results in MapleSim.

Examples will include control design, frequency analysis, vibration attenuation, parameter sweeps, Monte-Carlo and optimization, and sensitivity analysis. Attendees will be provided with an evaluation copy of Maple and MapleSim for use on their own Windows, Mac, or Linux computer.

Tutorial 7 (Room: Seminarraum S5):
Code-Export in SimulationX - Steps from offline model to real-time platform
by Karsten Todtermuschke, ITI Gmbh, Germany

The tutorial provides the creation of a simple powertrain model using elements from the Modelica Standard Library. Different analyzing methods like computation of natural frequencies or error estimates of state variables will be applied to ensure the real-time capability of this model.

Afterwards, a functional mock-up unit (FMU) of a selected component of the powertrain will be created for both Model Exchange and Co-Simulation via code export. This will be followed by a re-import of the generated FMU into the powertrain model.

Finally, the comparison of the created models will show the similarities and differences between Model Exchange and Co-Simulation.

Tutorial 8 (Room Seminarraum S6):
Creating new tools for Modelica using the Modelica SDK
by Peter Harmann, DeltaTheta, UK

Modelica models contain a significant resource of company intellectual property, from parameter data to the connectivity of subsystems in products. Development of Modelica libraries also creates, and requires, a lot of information such as where and how each model definition is utilised. The deltatheta Modelica SDK (Software Development Kit) maximises the use of this information by providing a complete Modelica implementation embedded in a software library. This allows developers to create their own tools and utilities that can access, query, modify, translate and simulate Modelica models.

Participants in this tutorial will learn how to use simple programming tools together with the deltatheta Modelica SDK to create powerful tools that can extract valuable information from their Modelica libraries. All software required will be provided and only basic programming experience is needed.

Exhibitors

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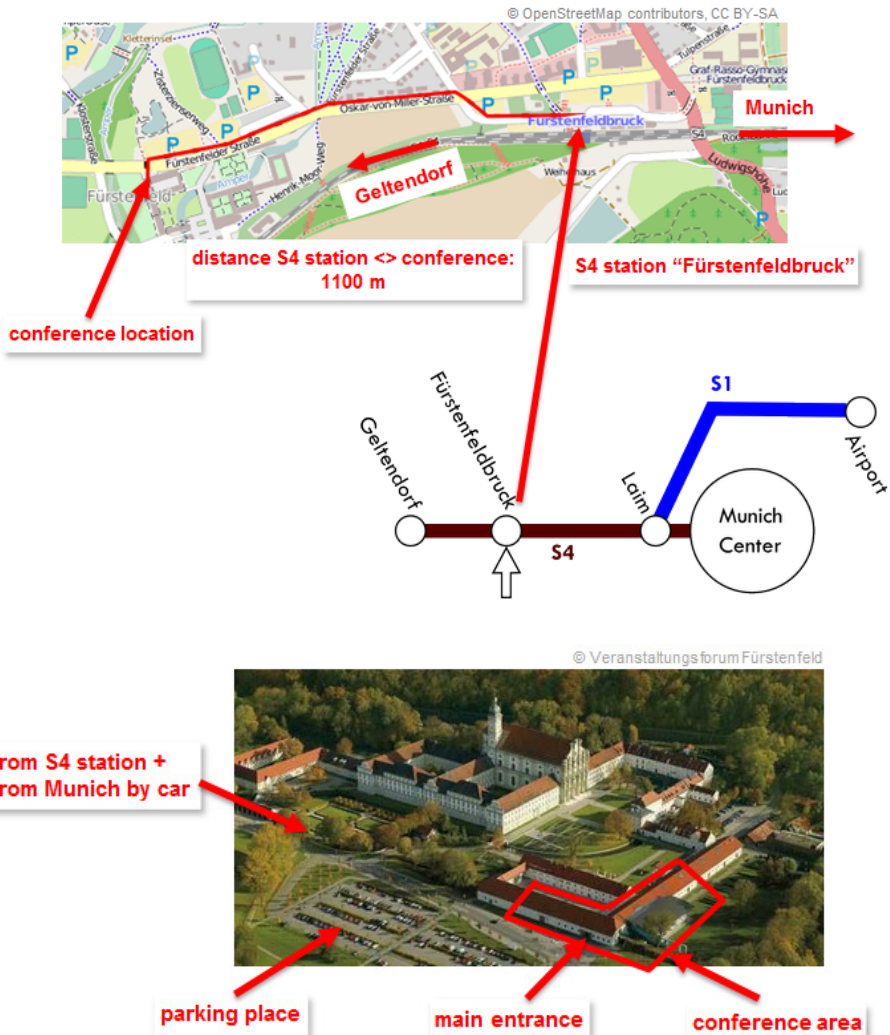
Travel Information and Maps of the Venue

The conference convention center is located in the western part of Munich:

Veranstaltungsforum Fürstenfeld
Fürstenfeld 12 (for your navigation system, use "Zisterzienserweg 1")
82256 Fürstenfeldbruck
Tel.: 08141/6665-140

Arrival by plane:

- Arrival at airport [Franz-Josef Strauß](#)
  From there by taxi (about 40 minutes / 90€) or

- By rental car (car rental desks are located on the arrivals level of the terminal) or

- By public transport (schedule: http://www.bahn.de/i/view/GBR/en,
  From: "München Flughafen Terminal";
  To: "Fürstenfeldbruck Bahnhof")

  - Obtain a ticket at the S-Bahn Station ("Einzelfahrt 4-Zonen" 10€). The ticket is sufficient for the whole ride. An "Einzelfahrt" ticket gets automatically stamped and is then valid only at the time when you buy it. It is also possible to buy a "Einzelfahrt" ticket for a particular date (e.g. when you travel back). In this case the date has to be given at the ticket machine.
  - Take the S-Bahn S1 direction "Ostbahnhof", exit in "Laim", trains run every 20 minutes.
  - At station Laim change to S4 direction "Geltendorf (you have to change the platform).
  - Exit at S-Bahn Station Fürstenfeldbruck. A shuttle bus operates between the S4 station and the conference venue in the morning and in the evening (see next page).
  - Alternatively you can walk the 1.1 km from the S-Bahn station to the conference center.

Arrival by train:

- Arrival at Munich Central Station (Hauptbahnhof)

- Obtain a ticket at the S-Bahn Station ("Einzelfahrt 2-Zonen" 5€).

- Take the S-Bahn S4, direction Geltendorf.

- Exit at S-Bahn Station Fürstenfeldbruck. A shuttle bus operates between the S4 station and the conference venue (see next page).

- Alternatively you can walk the 1.1 km from the S-Bahn station to the conference center.

Arrival by car:

- The address: Zisterzienserweg 1, 82256 Fürstenfeldbruck should lead you directly to the parking lot.

- Free parking is available (large parking place directly at the conference location).
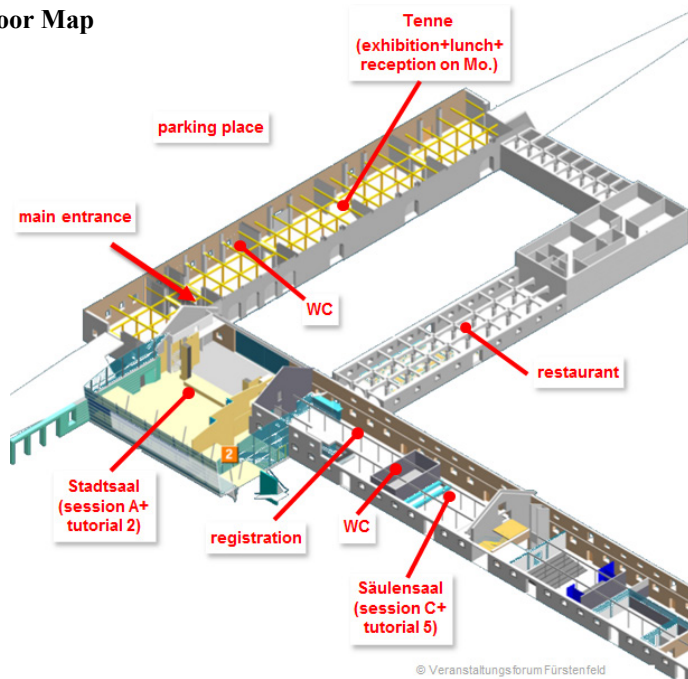
Shuttle Service

A free shuttle service is organized between the S4 train station and the conference venue. This is a special service just for the conference. Have a look at a bus with sign "Modelica". The bus operates in the morning and in the evening and drives from the station to the conference venue and vice versa. You have to wait for a maximum of 10-15 minutes.
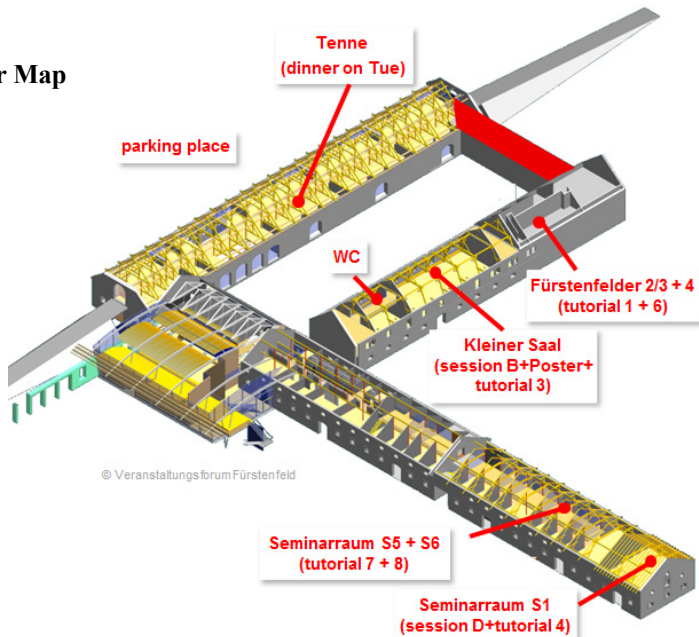
Operating times:

| | Bus operation time | S4 arrival/departure times | |
		from Munich	to Munich
Monday, Sept. 3	13:00 – 15:00	13:07 13:27 13:47 14:07 …	
	20:00 – 22:00		… 20:51 21:11 21:31 21:51
Tuesday, Sept. 4	8:00 – 10:00	8:07 8:27 8:47 9:07 …	
	21:30 – 23:30		… 22:11 22:31 22:51 23:31
Wednesday, Sept. 5	7:30 – 9:30	7:47 8:07 8:27 8:47 …	
	14:30 – 16:30		… 15:31 15:51 16:11 16:31

Ground Floor Map

Tenne
(exhibition+lunch+
reception on Mo.)

parking place

main entrance

WC

restaurant

Stadtsaal
(session A+
tutorial 2)

registration

WC

Säulensaal
(session C+
tutorial 5)

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First Floor Map

Tenne
(dinner on Tue)

parking place

WC

Fürstenfelder 2/3 + 4
(tutorial 1 + 6)

Kleiner Saal
(session B+Poster+
tutorial 3)

Seminarraum S5 + S6
(tutorial 7 + 8)

Seminarraum S1
(session D+tutorial 4)

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Useful Information

For the Conference

The registration desk is close to the door to the right side when you enter the main entrance. It is open:

Monday	13:00 - 20:00
Tuesday	8:30 - 19:00
Wednesday	8:00 - 15:00

Wireless internet is available for the conference participants in the whole conference venue. Logins and passwords can be obtained at the registration desk.

Tutorials take place on Monday 14:00 – 17:45. There is a 15 min. coffee break during every tutorial. Coffee and beverages are served directly at the respective tutorial room.

The Opening Concert takes place on Monday from 17:50 to 18:20. It is performed by the "Abo Sax" Saxophone Quartet from the "Akademische Blasorchester München", www.abo-muc.de.

Reception and dinner buffet takes place on Monday 18:20 – 21:00 in the "Tenne" ground floor. There is enough food to fill your stomach.

Coffee breaks take place in the "Tenne" ground floor. There are three breaks on Tuesday and one break on Wednesday morning.

Lunches on Tuesday and Wednesday are served as buffet on cocktail tables in the "Tenne" ground floor.

The conference dinner takes place on Tuesday 19:00 – 22:30 in the "Tenne" first floor.

For your Stay in the Munich Area

Emergency number is 112. This number will connect you to police, ambulance, or fire department. The emergency number does not require an area code and the phone call is free.

German time (CEST) is in Summer (from March to October) two hours ahead of Greenwich Mean Time (UTC + 2 hours).

Supermarkets are usually open 8 a.m. – 8 p.m. on weekdays (Monday to Saturday). Shops are usually open 9.30 a.m. – 8 p.m. on weekdays (Monday to Saturday). On Sunday and public holidays supermarkets and shops are closed. However, gas stations are open on Sunday and most of them have a shop.

Prices in Germany already contain value-added tax (VAT). Additional tips in the amount of 5-10% of the bill are usual in restaurants if you are satisfied with the food.

Post offices and mailboxes are yellow and bear the label "Deutsche Post".

The **tap water** in Bavaria is safe to drink and has a good taste.

The **voltage** in Germany is 220 V, 50 Hz. Round "European" two-pin plugs and sockets are used.

Only **pharmacies** (German: "Apotheke") sell medicines. They are open Monday to Saturday, and a few are open also on Sunday (on Sunday, the door is closed and one has to ring). Opening hours are quite different. The pharmacy closest to the conference location is:

Stadt-Apotheke
Hauptstr. 18
82256 Fürstenfeldbruck
Mo-Fr.: 8:00 – 18:30
Sat: 8:30 – 13:00