

## Modelica Training:

# Object-Oriented Modeling and Simulation of Thermal Systems

TLK-Thermo GmbH, in cooperation with the Institut für Thermodynamik at the Technische Universität Braunschweig, offers a two-day training course about object-oriented modeling and simulation of thermal systems.

The training course includes the following:

- Object-oriented and equation-based formulation of differential-algebraic equation systems for the description of thermal systems using the simulation language Modelica ([www.modelica.org](http://www.modelica.org))
- Characterisation of DAE systems and solution processes such as index reduction
- Hybrid (event-oriented) modeling
- Object-oriented analysis and modeling

During the course, the participants work on the following and other examples with the assistance of our Modelica experts:

- Formulation of physical balances and conservation laws
- Creation of an object-oriented model library for the simulation of a thermal solar system including evaporation, condensation and flow reversal
- Model library with electronic elements for the object-oriented description of heat transfer mechanisms (analogical models).

After the training course, the participants will be capable of independently creating complex Modelica Libraries on the basis of an object-oriented analysis. They also receive the necessary mathematical and numerical understanding to formulate “balanced” Modelica models and to recognize and solve numerical difficulties in solving. The technical basics of simulation required for understanding complex libraries is taught.

Participants are provided with notebooks prepared for the course with all course examples, necessary media data in TILMedia and the visualization tool DaVE for state charts. In addition, course documentation is distributed as a supplement to written notes.

The training begins at 8:00 am on the first day and ends at 4:30 pm on the second day.

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### Contact.

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## Modelica Training Description

The cost of the training is € 580,- per day (in total € 1160,-). University students as well as PhD candidates receive a discount upon request. Included in the training fees is the course documentation, the above listed software, as well as lunch, drinks and snacks during the breaks.

We flexibly respond to your particular needs, and can answer your training course related questions by phone or e-mail, both before and after the training.

In the case that you are interested in the training and would like to learn more about the content of the training course, do not hesitate to contact me.



Best regards,

Wilhelm Tegethoff

### **selected Modelica Expressions**

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package, model, connector, flow, stream, inner/outer, if/when, noEvent(), extends, replaceable/redeclare, for, der(), initial equation stateSelect, fixed, start, input/output, homotopy()

### **selected Keywords**

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ODE, DAE, Euler's method, residual equations, BDF method, linear analysis, stiffness, convective variables, chattering, modifier, index reduction, inheritance, polymorphism

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### **Contact.**

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