Start Tuesday Sept 29, 2009 9.15-17.00

Course at Linköping University, Room: John von Neumann
Location: Building B, 2nd floor

Principles of Object-Oriented Modeling and Simulation of Dynamic Systems with Modelica

Hands-on exercises using OpenModelica—Bring Laptop!

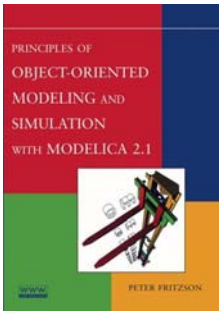
The course has the following goals

- Being easily accessible for people who do not previously have a background in modeling and simulation.
- Introducing the concepts of physical modeling, object-oriented modeling and component-based modeling and simulation.
- Demonstrating modeling examples from several application areas.
- Providing opportunity for hands-on exercises with the OpenModelica open-source implementation of Modelica and the MathModelica Lite graphic user interface

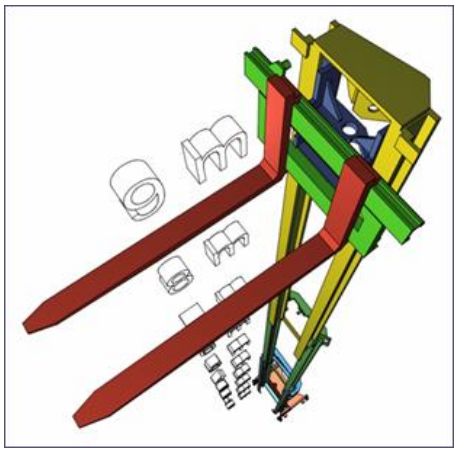
The tutorial is based on Peter Fritzson's book:

Principles of Object-Oriented Modeling and Simulation with Modelica 2.1

ISBN: 0-471-47163-1
Paperback, 940 pages
February 2004, Wiley-IEEE Press



Course Content



Object-Oriented modeling is a fast-growing area of modeling and simulation that provides a structured, computer-supported way of doing mathematical and equation-based modeling. Modelica is today the most promising modeling and simulation language in that it effectively unifies and generalizes previous object-oriented modeling languages and provides a sound basis for the basic concepts. The Modelica modeling language and technology is being warmly received by the world community in modeling and simulation with major applications in virtual prototyping. It is bringing about a revolution in this area, based on its ease of use, visual design of models with combination of lego-like predefined model building blocks, its ability to define model libraries with reusable components, its support for modeling and simulation of complex applications involving parts from several application domains, and many more useful facilities.

The tutorial presents an object-oriented component-based approach to computer supported mathematical modeling and simulation through the powerful Modelica language and its associated technology. Modelica can be viewed as an almost universal approach to high level computational modeling and simulation, by being able to represent a range of application areas and providing general notation as well as powerful abstractions and efficient implementations.

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 OpenModelica environment together with the graphical user interface MathModelica Lite will be used for hands-on exercises.

Lecturer

Peter Fritzson is a Professor and Research Director of the Programming Environment Lab (Pelab), at the Department of Computer and Information Science, Linköping University, Sweden. He has been chairman of the Scandinavian Simulation Society, secretary of the European simulation organization, EuroSim. He is vice chairman of the Modelica Association, and Director of the Open Source Modelica consortium. His main area of interest is software engineering, especially languages, programming and maintenance tools and environments, including modeling and simulation. Professor Fritzson has published ten books/proceedings and more than 190 papers.

Useful Links

The OpenModelica project website:
www.openmodelica.org

Peter Fritzson's book:

Principles of Object-Oriented Modeling and Simulation with Modelica 2.1
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0471471631.html
also:
www.ida.liu.se/labs/pelab/modelica/OpenModelica/Documents/ModelicaBookExcerpts.pdf
also: www.mathcore.com/drmodelica.

Graphic user interface:
https://trac.elet.polimi.it/simforge/