Tutorial

INTRODUCTION TO OBJECT-ORIENTED MODELLING BY MEANS OF
THE MODELICA SIMULATION LANGUAGE

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Abstract -

In times of rising concerns about green house problems the development of hybrid electric vehicles or electric vehicles has become a very prosperous field of application. Simulation has therein occupied a very crucial role because of the vehicles internal massive interconnection between different physical subsystems. Best performance of the vehicle can only be achieved if it is regarded as one system and optimised components are working in an optimised environment. Therefore a multiphysical simulation approach is inevitable.

The tutorial gives an introduction to such an object-oriented, component based multiphysical modelling by means of the powerful Modelica simulation language (http://modelica.org) and its associated technology. Modelica can be viewed as an almost universal approach to high level computational modelling 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 overview about the basic concepts of modelling and simulating with Modelica and consists of two parts. The first part will be focused on the basic physical modelling principles using algebraic and ordinary differential equations. In the second part the usability will be demonstrated on some simple application models which will then be assembled to a very basic electric or hybrid electric vehicle model.

Biographies of the Speakers

Dragan SIMIC received the Dipl. Ing. degree in mechanical engineering from Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture University of Split, Croatia, in 1999 and PhD from the Vienna University of Technology, Austria, in 2007, respectively. At the Austrian Institute of Technology he is concerned with vehicle modelling and modelling of mechanical vehicle components focusing especially on Modelica. He is involved in model development for the automotive industry and the development of electric vehicle components. He is member of the Modelica Association.

Thomas BÄUML studied mechatronics at the University of Applied Sciences in Wiener Neustadt. He is currently working at the Austrian Institute of Technology and pursuing the Ph.D. degree at the Vienna University of Technology. His main activities are focused on vehicle simulations and energy management strategies as well as thermal simulations of electrical machines and systems. He is member of the Modelica Association.

Markus EINHORN was born in 1984 in Vienna and received the BSc and Dipl.Eng. with distinction in Electrical Engineering from the Vienna University of Technology in 2008 and 2009 respectively. He is currently working at the Austrian Institute of Technology and pursuing the Ph.D. degree at the Vienna University of Technology. His recent work is focused on design and modelling of power electronics and battery systems.

References
