Abstract
The presentation will show several aspects of the development of a high integration ECU. The development is based on automotive requirements. The safety demands, which have to be fulfilled, are derived from the ASIL classification of the applications and the ISO26262. The software is based on AUTOSAR 3.2 and enhanced with safety aspects, which also will be shown. Some security aspects to protect the ECU and to enable special functionalities will also be shown. The ECU integrates a lot of functionalities. Therefore, the integration process is important as well as the timely behavior of all software components. On this basis, the approval of schedulability and time behavior will be pointed out. It also will be illustrated, how flash concepts could support the independent approval and development of software modules.

Bio
Markus Buhlmann has a diploma degree in electronic engineering from Technical University of Munich. He started 1992 at Audi, in the technical customer department. In 1999 he changed to the technical development, where he was responsible for electrical development for CAN networks and, after this, for time triggered networks and FlexRay. In 2007 he changed to chassis development and was responsible for the rear differential ECU. In 2010 he became team leader and since 2011 he is head of unit and responsible for vertical dynamics ECU’s and software integration.
Keynote II

Model-Based Design of Real-Time Systems

Lothar Thiele

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Abstract

Model-based techniques have found widespread use in the design of embedded systems. Models and methods are typically based on well-defined models of computation and allow for building composite components out of simpler components. The advantages of using high-level system abstractions that comprise software as well as the underlying hardware platform lead to an increasing use of the associated design methods: Methods and tools for correctness in terms of qualitative and quantitative requirements, as well as design environments for specification, design space exploration, optimization and code generation. Model-based design is getting increasingly important in the context of parallel and distributed embedded systems due to the tremendous complexity induced by concurrent execution.

For real-time systems, it is important to guarantee throughput and latency for each application running on the designed system. Analysis and design techniques that are able to provide such guarantees have been proposed for some of the celebrated platform models and models of computation. In other cases the classical hard real-time scheduling models and algorithms are directly applicable. In the presentation we will classify and link model-based design techniques, models of computation, as well as real-time scheduling theory and algorithms.

Bio

Lothar Thiele received his Diplom-Ingenieur and Dr.-Ing. degrees in Electrical Engineering from the Technical University of Munich in 1981 and 1985 respectively. After completing his Habilitation thesis from the Institute of Network Theory and Circuit Design of the Technical University Munich, he joined the Information Systems Laboratory at Stanford University in 1987. In 1988, he took up the chair of microelectronics at the Faculty of Engineering, University of Saarland, Saarbrücken, Germany. He joined ETH Zürich, Switzerland, as a full Professor of Computer Engineering, in 1994. His research interests include models, methods and software tools for the design of embedded systems, embedded software and bio-inspired optimization techniques. Lothar Thiele is associate editor of IEEE Transaction on Industrial Informatics, IEEE Transactions on Evolutionary Computation, Journal of Real-Time Systems, Journal of Signal Processing Systems, Journal of Systems Architecture, and INTEGRATION, the VLSI Journal.

In 1986 he received the "Dissertation Award" of the Technical University of Munich, in 1987, the "Outstanding Young Author Award" of the IEEE Circuits and Systems Society, in 1988, the Browder J. Thompson Memorial Award of the IEEE, and in 2000-2001, the "IBM Faculty Partnership Award". In 2004, he joined the German Academy of Sciences Leopoldina. In 2005, he was the recipient of the Honorary Blaise Pascal Chair of University Leiden, The Netherlands. Since 2009 he is a member of the Foundation Board of Hasler Foundation, Switzerland. Since 2010, he is a member of the Academia Europaea. In 2013, he joined the National Research Council of the Swiss National Science Foundation.