

学术报告会

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Towards the total automation of cyber physical systems design – SystemJ approach

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Abstract:

An approach to the design of complex embedded cyber-physical systems will be presented in this talk. SystemJ language, initially aimed at general concurrent and distributed systems has found its way to cyber-physical world to become a language with which a design begins and, after passing various transformations, results in a suitable/customised multicore platform for its execution. The language exhibits features that easily capture reactive, concurrent systems with arbitrary number of hierarchical levels and as such is suitable for large class of cyber-physical systems, including those in distributed setting. SystemJ is based on Globally asynchronous Locally Synchronous (GALS) formal model of concurrency and reactivity. The fact allows system designers to check for properties of the designed system statically at compile time, as well as of guaranteeing hard real-time constraints if executed on our new execution platform, Network-on-Chip Heterogeneous Multiprocessor, NoC_HMC, which will be introduced, too. NoC-HMP is time predictable multicore system and is the enabler of a full automation of design process, from specification in SystemJ to runnable system on NoC-HMP. Multi-dimensional research has been developed related to generation of efficient code that runs on a time-predictable NoC-HMP. We will illustrate the power of SystemJ on the example of an industrial automation system that includes mechatronic devices and robots.

Biography:

Zoran Salcic holds a chair in computer systems engineering at the University of Auckland, New Zealand. He has the BE ('72), ME ('74) and PhD ('76) degree in electrical and computer engineering (Sarajevo University). His main research interests are in cyber-physical systems and their design, complex embedded systems and their implementation, design automation tools for embedded systems, hardware-software co-design, models of computation and languages for concurrent and distributed systems. He has published over 300 peer-reviewed journal and conference papers and several books. In his career, he was the Dean of Faculty of Electrical Engineering, Sarajevo University (Yugoslavia) and Head of Department of Electrical and Computer Engineering, the University of Auckland. He is a Fellow of the Royal Society (Academy of Science) New Zealand and recipient of Alexander von Humboldt Research Award, Germany, in 2010.