

2012 7th IEEE International Symposium on Industrial Embedded Systems

(SIES 2012)

**Karlsruhe, Germany
20 – 22 June 2012**



**IEEE Catalog Number: CFP12INB-PRT
ISBN: 978-1-4673-2685-8**

Table of Contents

Table of Contents	i
Welcome Message	v
List of Technical Program Committee (TPC) Members	vi
List of Work-in-Progress (WIP) Technical Program Committee (TPC) Members	viii

Keynotes

Dependable Software for Undependable Hardware
Jörg Henkel (Karlsruhe Institute of Technology (KIT), Germany)

Embedded systems in automation - Commodities and challenges
René Graf (Siemens AG, Nuremberg, Germany)

Networks I

Formal Worst-Case Timing Analysis of Ethernet Topologies with Strict-Priority and AVB Switching.....	1
<i>Jonas Diemer, Daniel Thiele and Rolf Ernst</i>	
Worst-case delay analysis on a real-time heterogeneous network.....	11
<i>Xiaoting Li, Jean-Luc Scharbag and Christian Fraboul</i>	
Response-Time Analysis of the FlexRay Dynamic Segment under Consideration of Slot-Multiplexing	21
<i>Moritz Neukirchner, Mircea Negrean, Rolf Ernst and Torsten T. Bone</i>	

Scheduling

Certification-cognizant scheduling of tasks with pessimistic frequency specification.....	31
<i>Sanjoy Baruah</i>	
Global schedulability analysis of a synchronization protocol based on replenishment-bounded overrun for compositional real-time systems	39
<i>Sjoerd Cranen and Reinder J. Bril</i>	
Online Intra-Task Device Scheduling for Hard Real-Time Systems.....	48
<i>Muhammad Ali Awan and Stefan M. Petters</i>	
An Improved Preemption Delay Upper Bound for Floating Non-preemptive Region.....	57
<i>José Manuel Marinho, Vincent Nélis, Stefan M. Petters and Isabelle Puaut</i>	

Networks II

A Performance Study of Audio Video Bridging in Aeronautic Ethernet Networks	67
<i>Emanuel Heidinger, Fabien Geyer, Stefan Schneele and Michael Paulitsch</i>	

Implementing Hierarchical Scheduling on COTS Ethernet Switches Using a Master/Slave Approach	76
<i>Zahid Iqbal, Luis Almeida, Ricardo Marau, Moris Behnam and Thomas Nolte</i>	
Design of Networked Control Systems (NCSs) on the basis of interplays between Quality of Control and Quality of Service.....	85
<i>Xuan Hung Nguyen and Guy Juanole</i>	

Embedded Systems Design

On the Timing Analysis of the Dynamic Segment of FlexRay	94
<i>Unmesh D. Bordoloi, Bogdan Tanasa, Petru Eles and Zebo Peng</i>	
Opportunistic Hierarchical Classification for Power Optimization in Wearable Movement Monitoring Systems	102
<i>Francesco Fraternali, Mahsan Rofouei, Nabil Alshurafa, Hassan Ghasemzadeh, Luca Benini and Majid Sarrafzadeh</i>	
Inter-application Redundancy Elimination in Wireless Sensor Networks with Compiler-Assisted Scheduling	112
<i>Vikram Gupta, Eduardo Tovar, Karthik Lakshmanan and Ragunathan (Raj) Rajkumar</i>	
On Voting Strategies for Loosely Synchronized Dependable Real-Time Systems	120
<i>Hüseyin Aysan, Radu Dobrin, Sasikumar Punnekkat and Iain Bate</i>	

Software Engineering and Control

Efficient Implementation of AUTOSAR Components with Minimal Memory Usage	130
<i>Haibo Zeng and Marco Di Natale</i>	
Introducing Database-Centric Support in AUTOSAR.....	138
<i>Andreas Hjertström, Dag Nyström and Mikael Sjödín</i>	
Bandwidth Adaptation in Hierarchical Scheduling Using Fuzzy Controllers	148
<i>Nima Moghaddami Khalilzad, Moris Behnam, Giacomo Spampinato and Thomas Nolte</i>	

Stochastic Modeling

Probabilistic Preemption Control using Frequency Scaling for Sporadic Real-time Tasks ..	158
<i>Abhilash Thekkilakattil, Radu Dobrin and Sasikumar Punnekkat</i>	
Modeling Uncertainties in Safety-Critical Real-Time Systems: A Probabilistic Component-Based Analysis	166
<i>Dawood A. Khan, Luca Santinelli and Liliana Cucu-Grosjean</i>	

Multi-core

Embedded Systems: Many Cores - Many Problems.....	176
<i>Reinhard Wilhelm and Jan Reineke</i>	

Optimized Software Mapping for Advanced Driver Assistance Systems.....	181
<i>Timo Schönwald, Alexander Viehl, Oliver Bringmann and Wolfgang Rosenstiel</i>	
Response-Time Analysis for Non-Preemptive Scheduling in Multi-Core Systems with Shared Resources	191
<i>Mircea Negrean and Rolf Ernst</i>	

Modeling and Verification

Model-Driven Virtual Prototyping for Real-Time Simulation of Distributed Embedded Systems.....	201
<i>J. Zimmermann, S. Stattelmann, A. Viehl, O. Bringmann and W. Rosenstiel</i>	
A Formal Support for Homogeneous Simulation of Heterogeneous Embedded Systems.....	211
<i>Luigi Di Guglielmo, Franco Fummi, Graziano Pravadelli, Francesco Stefanni and Sara Vinco</i>	
Integrating PSL Properties into SystemC Transactional Modeling - Application to the Verification of a Modem SoC.....	220
<i>Laurence Pierre, Luca Ferro, Zeineb Bel Hadj Amor, Philippe Bourgon and Jérôme Quévremont</i>	
An LLVM-based Hybrid Binary Translation System	229
<i>Bor-Yeh Shen, Jyun-Yan You, Wu Yang and Wei-Chung Hsu</i>	

Safety and Error Checking

Enhancing Security in CAN Systems using a Star Coupling Router	237
<i>Roland Kammerer, Bernhard Frömel and Armin Wasicek</i>	
System configuration check against security policies in industrial networks.....	247
<i>Manuel Cheminod, Luca Durante and Adriano Valenzano</i>	
Fine-Grained Timing and Control Flow Error Checking for Hard Real-Time Task Execution.....	257
<i>Julian Wolf, Bernhard Fechner, Sascha Uhrig and Theo Ungerer</i>	

Work-In-Progress (WIP)

Scalable Virtual Prototyping of Distributed Embedded Control in a Modern Elevator System.....	267
<i>Alberto Ferrari, Marco Carloni, Alessandro Mignogna, Francesco Menichelli, David Ginsberg, Eelco Scholte and Dang Nguyen</i>	
Towards Runtime Adaptation in Real-time, Networked Embedded Systems.....	271
<i>Christian Prehofer and Marc Zeller</i>	
Design by Uncertainty: Towards the Use of Measurement Uncertainty in Real-Time Systems.....	275
<i>Peter Ulbrich, Florian Franzmann, Fabian Scheler and Wolfgang Schröder-Preikschat</i>	

LISPARC: Using an Architecture Description Language Approach for Modelling an Adaptive Processor Microarchitecture	279
<i>Carsten Tradowsky, Florian Thoma, Michael Hübner and Jürgen Becker</i>	
Non-generic floating-point software support for embedded media processing	283
<i>Claude-Pierre Jeannerod, Jingyan Jourdan-Lu and Christophe Monat</i>	
AUTOSAR OS on a Message-Passing Multicore Processor	287
<i>Florian Kluge, Mike Gerdes and Theo Ungerer</i>	
Response Time Analysis for Mixed Messages in CAN Supporting Transmission Abort Requests	291
<i>Saad Mubeen, Jukka Mäki-Turja and Mikael Sjödín</i>	
Combining Instruction Set Simulation and WCET Analysis for Embedded Software Performance Estimation	295
<i>Stefan Stattelmann, Sebastian Ottlik, Alexander Viehl, Oliver Bringmann and Wolfgang Rosenstiel</i>	
Shared Memory Protection for Spatial Separation in Multicore Architectures	299
<i>Anton Hattendorf, Andreas Raabe and Alois Knoll</i>	
Designing Embedded Systems with MARTE: A PIM to PSM Converter	303
<i>Roberto de Medeiros, Marcilyanne M. Gois, Drausio L. Rossi and Vanderlei Bonato</i>	
Performance Evaluation of Chirp Spread Spectrum Ranging for Indoor Embedded Navigation Systems	307
<i>Paolo Pivato, Stefano Dalpez and David Macii</i>	
A Predicate-Aware Modulo Scheduling for Improving Resource Efficiency of Coarse Grained Reconfigurable Architectures	311
<i>Jhin-Bin Jiang, Kuen-Cheng Chiang and Jean Jyh-Jiun Shann</i>	
Towards Resource Sharing under Multiprocessor Semi-Partitioned Scheduling	315
<i>Sara Afshar, Farhang Nematí and Thomas Nolte</i>	
Implementing Hierarchical Scheduling to Support Multi-Mode System	319
<i>Rafia Inam, Mikael Sjödín and Reinder J. Bril</i>	
Miniaturized wireless sensor node for earthquake monitoring applications	323
<i>Kevin I-Kai Wang, Zoran Salcic, Mathew R. Wilson and Karl M. Brook</i>	
Automated Bio Cybernetic System - A Lab-on-Chip Case Study	327
<i>Kevin I-Kai Wang, Zoran Salcic, Johnny Yeh, Jin Akagi and Donald Wlodkovic</i>	
Author Index	331