

Contents

Preface	xi
Acknowledgements	xiii
Conference Committees	xv
1 Applications and Case Studies	
Hierarchically Distributing Embedded Systems for Improved Autonomy ..	1
Claudius Stern, Philipp Adelt, Willi Richert, and Bernd Kleinjohann	
Sorting Units for FPGA-Based Embedded Systems	11
Rui Marcelino, Horácio Neto, and João M. P. Cardoso	
Error-Exploiting Video Encoder to Extend Energy/QoS Tradeoffs for Mobile Embedded Systems	23
Kyoungwoo Lee, Minyoung Kim, Nikil Dutt, and Nalini Venkatasubramanian	
2 Verification and Validation	
Specification-based Verification of Embedded Systems by Automated Test Case Generation	35
Christoph M. Kirchsteiger, Christoph Trummer, Christian Steger, Reinhold Weiss, and Markus Pistauer	
Analysis of Periodic Clock Relations in Polychronous Systems	45
Hugo Metivier, Jean-Pierre Talpin, Thierry Gautier, and Paul Le Guernic	
Formal Correctness of an Automotive Bus Controller Implementation at Gate-Level	57
Eyad Alkassar, Peter Böhm, and Steffen Knapp	

3 Design Methods and Modelling

- Unifying HW Analysis and SoC Design Flows by Bridging Two Key Standards: UML and IP-XACT** 69
 Sebastien Revol, Safouan Taha, François Terrier, Alain Clouard, Sébastien Gerard, Ansgar Radermacher, and Jean-Luc Dekeyser
- Expressing Environment Assumptions and Real-time Requirements for a Distributed Embedded System with Shared Variables** 79
 Simon Tjell and João M. Fernandes
- The Components Data Flow Machine: An Intermediate Modeling Format to Support the Design of Automobiles E/E Systems Architectures.** 89
 Augustin Kebemou and Ina Schieferdecker
- On the Use of Software Quality Metrics to Improve Physical Properties of Embedded Systems** 101
 Ricardo M. Redin, Marcio F. S. Oliveira, Lisane B. Brisolará, Julio C. B. Mattos, Luis C. Lamb, Flávio R. Wagner, and Luigi Carro

4 Resource Management

- Minimizing Leakage Energy with Modulo Scheduling for VLIW DSP Processors** 111
 Meng Wang, Zili Shao, Hui Liu, and Chun Jason Xue
- Using Imprecise Computation Techniques for Power Management in Real-Time Embedded Systems** 121
 Geovani Ricardo Wiedenhof and Antônio Augusto Fröhlich
- A Power Model for Register-Sharing Structures** 131
 Balaji V. Iyer and Thomas M. Conte

5 Middleware and Communication

- Design and Implementation of a FTT-CAN Communication Infra-Structure for the RT-femtoJava Processor** 143
 Rita Kalile Almeida Andrade, Thomás Alimena Del Grande, Tiago Bücker, and Carlos Eduardo Pereira
- Communication Paradigms for High-Integrity Distributed Systems with Hard Real-Time Requirements** 151
 Santiago Urueña, Juan Zamorano, José A. Pulido, and Juan A. de la Puente

6 Distributed Operating Systems and Timing

TinyOS Extensions for a Wireless Sensor Network Node Based on a Dynamically Reconfigurable Processor 161

Enkhbold Ochirsuren, Heiko Hinkelmann, Leandro Soares Indrusiak, and Manfred Glesner

Scheduling Dependent Distributable Real-Time Threads in Dynamic Networked Embedded Systems 171

Sherif Fahmy, Binoy Ravindran, and E. D. Jensen

An Efficient Time Annotation Technique in Abstract RTOS Simulations for Multiprocessor Task Migration 181

Henning Zabel and Wolfgang Müller

7 Task and Data Partitioning

Handling QoS Dependencies in Distributed Cooperative Real-Time Systems 191

Luís Nogueira and Luís Miguel Pinho

Topology-Aware Energy Efficient Task Assignment for Collaborative In-Network Processing in Distributed Sensor Systems 201

Baokang Zhao, Meng Wang, Zili Shao, Jiannong Cao, Keith C.C. Chan, and Jinshu Su

Data Partitioning Techniques for Partially Protected Caches to Reduce Soft Error Induced Failures 213

Kyoungwoo Lee, Aviral Shrivastava, Nikil Dutt, and Nalini Venkatasubramanian