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Formal Modeling of Adaptive and Mobile Processes

Preface

Kathrin Hoffmann, Julia Padberg

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Preface

Kathrin Hoffmann¹, Julia Padberg²

¹Institute for Software Technology and Theoretical Computer Science
Technical University Berlin, Germany

²University of Applied Sciences, Hamburg, Germany

Combining diverse topics as adaptive and mobile processes with formal modeling leads to an interesting collection of contributions. Here we find a mixture of agent-based, transformation-based and Petri-net-based approaches that share the distinction of dynamic behavior of the system and its change due to mobility and/or adaptation. Since mobility and adaptivity both induce strong challenges for dynamic systems, they both need new concepts for the formal modeling.

In contribution by Michael Köhler-Bußmeier object nets are used to model mobile systems. Object nets are Petri nets which have Petri nets as tokens – an approach known as the nets-within-nets paradigm. The same paradigm is employed for the results concerning the layered architecture for modeling workflows in Mobile Ad-Hoc networks (MANETs) using algebraic higher order nets by Padberg, Biermann and Hoffmann. In contrast Hoffmann, Ehrig and Padberg demonstrate the advantages of reconfigurable systems in MANETs and present the main results for this approach. Bottoni, De Rosa and Mecella also deal with the process management in MANETs. As the modifications occur dynamically, they propose the use of a rule-based formalism, expressed in terms of multi-set rewriting. An agent-based approach can be found in the paper by Pfalzgraf and Soboll, where the focus is on the construction of a transformation system for Multiagent Systems based on categorical notions. The contribution by Beierle and Kern-Isberner concerns the modeling of an agent's beliefs and their dynamic changes using inductive reasoning techniques for the agent's knowledge base.