Ölveczky, Peter Csaba; **Meseguer, José**
Specification of real-time and hybrid systems in rewriting logic. (English) Zbl 1001.68061
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Summary: This paper explores the application of rewriting logic to the executable formal modeling of real-time and hybrid systems. We give general techniques by which such systems can be specified as ordinary rewrite theories, and show that a wide range of real-time and hybrid system models, including object-oriented systems, timed automata, hybrid automata, timed and phase transition systems, and timed extensions of Petri nets, can indeed be expressed in rewriting logic quite naturally and directly. Since rewriting logic is executable and is supported by several language implementations, our approach complements property-oriented methods and tools less well suited for execution purposes, and can be used as the basis for symbolic simulation and formal analysis of real-time and hybrid systems. The relationships with the timed rewriting logic approach of Kosiuczenko and Wirsing are also studied.

MSC:

68Q42	Grammars and rewriting systems
68T27	Logic in artificial intelligence

Cited in **22** Documents

Keywords:

rewriting logic; Maude; real-time systems; hybrid systems; timed Petri nets; real-time object-oriented systems

Software:

HyTech; STeP; Maude; ELAN; Uppaal; Kronos; CafeOBJ

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