

# Emptiness and Finiteness for Tree Automata with Global Reflexive Disequality Constraints

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Received: 15 June 2011 / Accepted: 16 October 2012 / Published online: 8 November 2012  
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**Abstract** In recent years, several extensions of tree automata have been considered. Most of them are related with the capability of testing equality or disequality of certain subterms of the term evaluated by the automaton. In particular, tree automata with global constraints are able to test equality and disequality of subterms depending on the state to which they are evaluated. The emptiness problem is known decidable for this kind of automata, but with a non-elementary time complexity, and the finiteness problem remains unknown. In this paper, we consider the particular case of tree automata with global constraints when the constraint is a conjunction of disequalities between states, and the disequality predicate is forced to be reflexive. This restriction is significant in the context of XML definitions with monadic key constraints. We prove that emptiness and finiteness are decidable in triple exponential time for this kind of automata.

**Keywords** Tree automata · Global constraints · Disequality constraints · Decision problems

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The authors were supported by Spanish Ministry of Education and Science by the FORMALISM project (TIN2007-66523). The second author was also supported by a FPU grant from the Spanish Ministry of Education. The last author was also supported by the Spanish Ministry of Science and Innovation SweetLogics project (TIN2010-21062-C02-01).

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