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A generic framework for checking semantic equivalences between pushdown automata and finite-state automata. (English) Zbl 1378.68106

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Summary: For a given process equivalence, we say that a process g is *fully equivalent* to a process f of a transition system \mathcal{T} if g is equivalent to f and every reachable state of g is equivalent to some state of \mathcal{T} . We propose a generic method for deciding full equivalence between pushdown processes and finite-state processes applicable to every process equivalence satisfying certain abstract conditions. Then, we show that these conditions are satisfied by bisimulation-like equivalences (including weak and branching bisimilarity), weak simulation equivalence, and weak trace equivalence, which are the main conceptual representatives of the linear/branching time spectrum. The list of particular results obtained by applying our method includes items which are first of their kind, and the associated upper complexity bounds are essentially optimal.

MSC:

[68Q45](#) Formal languages and automata

[68Q60](#) Specification and verification (program logics, model checking, etc.)

[68Q85](#) Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)

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