A Decidability Result for the Model Checking of Infinite-State Systems

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Abstract We present a decidability result for the model checking of a certain class of properties that can be conveniently expressed as ground formulae of a first-order temporal fragment. The decidability result is obtained by importing into the context of model-checking problems some techniques developed for the combination of decision procedures for the satisfiability of constraints. The general decidability result is then specialized for checking properties of particular interest, such as liveness and safety, and, for the latter case, a more optimized algorithm has been proposed.

1 Introduction

Infinite-state model checking is a branch of model checking that studies methods to cope with the verification of abstract models of complex systems whose formalizations require handling unbounded data, such as the case of software systems manipulating integers, reals, and so on, or the case of parameterized systems or real-time modeling, just to name but a few. The literature in the field is vast, and different techniques have been developed to deal with infinite-state systems: *abstraction* and

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