

EINLADUNG

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Titel: Memory and Delay in Regular Infinite Games

Abstract:

We consider infinite two-player games as used for the design and verification of reactive systems. For the class of regular games, Büchi and Landweber (1969) showed that one of the players has a winning strategy which, moreover, can be realized by a finite-state automaton. Even though it follows from a result of Dziembowski et al. (1997) that there exist exotic regular games for which the size of automata implementing winning strategies is at least exponential in the size of the game arena, most practical cases require far less space. In the first part, we address the classical problem of computing finite-state winning strategies which can be realized with as little memory, i.e., number of states, as possible. We propose an efficient algorithm which reduces the memory and apply it to several classes of regular conditions. Moreover, we present results showing that our technique can lead to an exponential gain in the size of the memory.

In the second part, we introduce a generalized notion of strategies: one of the players is allowed to delay each of his moves for a finite number of steps, or, in other words, exploit in his strategy some lookahead on the moves of the opponent. This setting captures situations in distributed systems, for example, when buffers are present in communication between remote components. Our concept of strategies corresponds to the class of continuous operators, thereby extending the work of Hosch and Landweber (1972) and, in particular, that of Büchi and Landweber (1969). Our main result is that the problem whether a given regular specification is solvable by a continuous operator is decidable and that each continuous solution can be reduced to one of bounded lookahead.

Es laden ein: Die Dozenten der Informatik