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Inductive synthesis of recursive processes from logical properties. (English) Zbl 1003.68070

Summary: This paper proposes an inductive synthesis algorithm for a recursive process. To synthesize a process, facts, which must be satisfied by the target process, are given to the algorithm one by one since such facts are infinitely many in general. When \( n \) facts are input to the algorithm, it outputs a process which satisfies the given \( n \) facts. And this generating process is repeated infinitely many times.

To represent facts of a process, we adopt a subcalculus of \( \mu \)-calculus. First, we introduce a new preorder \( \preceq_d \) on recursive processes based on the subcalculus to discuss its properties. \( p \preceq_d q \) means that \( p \models f \) implies \( q \models f \), for all formulae \( f \) in the subcalculus. Then, its discriminative power and relationship with other preorders are also discussed. Finally, we present the synthesis algorithm. The correctness of the algorithm can be stated that the output sequence of processes by the algorithm converges to a process, which cannot be distinguished from the intended one (if we could know it) by a given enumeration of facts, in the limit. A prototype system based on the algorithm is stated as well.

MSC:
68Q60 Specification and verification (program logics, model checking, etc.)

Full Text: DOI Link

References:
[4] Brinksma, E., A tutorial on LOTOS, Proceedings IFIP workshop on protocol specification, testing and verification V, (1986), North-Holland Amsterdam, p. 73-84
[16] Hopcroft, E.J.; Ullman, J.D., Introduction to automata theory, languages and computation, (1979), Addison-Wesley Reading - Zbl 0426.68001
[18] Manna, Z.; Wolper, P., Synthesis of communicating processes from temporal logic specifications, ACM trans. program. lan-
guages systems, 6, 68-93, (1984) · Zbl 0522.68030


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