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A logical characterization of observation equivalence. (English) Zbl 0558.68027

S. D. Brookes and W. C. Rounds [Lect. Notes Comput. Sci. 154, 97-108 (1983; Zbl 0536.68042)] showed that a finitary formal language (‘regular trace language’, or Reg-TL, for short) which allowed a certain kind of quantification using regular subsets of $\Sigma^*$ was not strong enough to distinguish all pairs of observationally inequivalent synchronization trees. In the present paper this result is extended to show that there is no class C of subsets of $\Sigma^*$ such that C-TL can distinguish all pairs of observationally inequivalent synchronization trees. Then a characterization of observation equivalence in terms of an infinitary formal language $S$-TL($\omega$) is given. This language is obtained as an extension of the language $S$-TL (‘singleton trace language’) of Hennessy and Milner by the addition of a connective of $\omega$-conjunctions of formulas of finite bounded depth.

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68Q65 Abstract data types; algebraic specification
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