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**Toyama, Yoshihito** (J-NTTEC)

**How to prove equivalence of term rewriting systems without induction.**

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A reduction system is a structure  $R = (A, \rightarrow)$  consisting of a set  $A$  and a binary relation  $\rightarrow$  on  $A$ . A term rewriting system is a reduction system where  $A$  is the set  $T(F, V)$  of terms over a set  $F$  of function symbols and a set  $V$  of variables, and  $\rightarrow$  is a set of rewrite rules  $(l, r)$ :  $l \notin V$ , and any variable in  $r$  also occurs in  $l$ .

The author proposes a new simple method to establish the equivalence of two reduction systems with respect to a restricted domain. This method is not directly based on induction but uses reachability of reduction systems and the Church-Rosser property. A distinction is made between abstract properties of the reduction relation and properties depending on the term structure.

The author's method extends earlier approaches and is not limited to term rewriting: it also applies to various other reduction systems (Thue systems, graph rewriting,  $\lambda$ -calculus). An application of this method's equivalence-preserving transformations consists in proving the correctness of some program transformation rules.

*Peter R. J. Asveld* (NL-TWEN-C)