Constructible reversible logic: further properties and some applications

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In 2008 N. Nepejvoda described a costructible logic with group semantics [1]. The logic contains constructible implication $\Rightarrow$, constructible conjucntion & and negation $\sim$ and a constant E. These connectives are freely combined with classical boolean operations $\supset, \wedge, \vee, \neg$. A set of elements and a set of actions over the elements are denoted by the single group G, because of natural isomorphism between group elements and group automorphisms. Every propositional letter A denotes a subset $\zeta(A)$ of G; $\zeta(A)$ is not necessarily a subgroup of G.

The logic was developed in some later papers [2], in particular, it was shown that constructible reversible logic is not a logic with finite number of logical values. Now we present some more new results about this logic.

1. Undecidability of constructible reversible logic with E. The proof is based on Novikov–Adyan result about group equations.
2. Power of the subclasses $\{\&, \sim\}$ and $\{\Rightarrow, \sim\}$ coincides with power of the whole constructible reversible logic.
3. In some cases the logic does not demand group structure of the initial G.
4. Constructible reversible logic can be used in program transformation and analysis if the underlying language also has group semantics.

Литература

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