

Orbit Relation and Isomorphism Type for Computable Trees Under Predecessor

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It is known that for two computable, finite-branching trees under the predecessor function which are isomorphic to each other, there is an isomorphism between them which is low relative to $\mathbf{0}'$. We address this issue from a different perspective by asking how complicated the orbit relation is for elements of such a tree.

The orbit relation for the tree T is defined to be the set of ordered pairs (x, y) for which there is an automorphism of T which maps x to y .

We show that the orbit relation for a computable, finite-branching tree under the predecessor function is Π_0^2 . We also show that the isomorphism type of such a tree is determined by the Σ_1 -theory of the tree.

Both of these results parallel results for computable algebraic fields [1].

Keywords: orbit relation, isomorphism type, tree with predecessor function

References

1. A. Frolov, I. Kalimullin, & R. G. Miller; Spectra of algebraic fields and subfields, *Mathematical Theory and Computational Practice – Fifth Conference on Computability in Europe, Lecture Notes in Computer Science 5635* (Berlin: Springer-Verlag, 2009), 232-241.