

SEQUENCES OF n -DIAGRAMS

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Abstract

We consider only effective languages L and their countable structures \mathcal{A} . For $n \in \omega$, the Σ_n diagram of \mathcal{A} consists of all Σ_n^0 sentences in the expanded language $L_{\mathcal{A}}$, which are true in $(\mathcal{A}, (a)_{a \in A})$. The Σ_{n+1} diagram of \mathcal{A} is c.e. in and above the Σ_n diagram of \mathcal{A} , uniformly in n . A structure is computable if its Σ_0 diagram is computable. A structure is decidable if its elementary diagram is computable.

We give necessary and sufficient definability conditions, expressed in terms of \mathcal{A} and n , which guarantee for all isomorphic copies \mathcal{B} of \mathcal{A} , that the Σ_{n+1} diagram of \mathcal{B} and the Σ_n diagram of \mathcal{B} are Turing equivalent. We show that every countable structure \mathcal{A} has an isomorphic copy \mathcal{B} such that the atomic diagram of \mathcal{B} and the elementary diagram of \mathcal{B} are Turing equivalent. Finally, for isomorphic copies of \mathcal{A} , which satisfies certain general conditions, we investigate possible sequences of Turing degrees of all Σ_n diagrams.