Index sets of decidably categorical and computably categorical structures

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ABSTRACT

Let $K$ be a class of structures, closed under isomorphism. A computable characterization for $K$ should separate the computable members of $K$ from other structures, where these are either not in $K$, nor computable. Goncharov and Knight [?] introduced three different approaches to computable characterization for classes of structures. One of these approaches is based on the notion of an index set.

Suppose that $K$ is a class of computable structures of a signature $\sigma$. Suppose also that $K$ is closed under isomorphism. The index set of the class $K$ is the set

$$I(K) = \{ e \in \omega : \exists \mathfrak{M} \in K (\varphi_e = \chi_{D(\mathfrak{M})}) \},$$

where $\chi_{D(\mathfrak{M})}$ is the characteristic function of the atomic diagram of $\mathfrak{M}$.

A computable structure $\mathfrak{M}$ is computably d-categorical if for every computable copy $\mathfrak{N}$ of $\mathfrak{M}$, there exists a $d$-computable isomorphism. A decidable structure $\mathfrak{M}$ is decidably d-categorical if for every decidable copy $\mathfrak{N}$ of $\mathfrak{M}$, there exists a $d$-computable isomorphism.

We will talk about the complexity of index sets of decidably categorical and computably categorical structures.

References