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 σ. Suppose also that K is closed under isomorphism. The **index set** of the class K is the set

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

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

[1] Goncharov S.S., Knight J. F. *Computable structure and non-structure theorems*, Algebra and Logic 41, no. 6, pp. 351–373, 2002.