On algebras with easy direct limits

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Abstract

The direct limit construction belongs to basic tools used in Universal algebra. We will focus on direct limit families in which only one algebra occurs.

Let $\mathcal{A}$ be an algebra. We denote by $\mathbf{L}\mathcal{A}$ the class of all isomorphic copies of direct limits which can be obtained from $\mathcal{A}$ and we denote by $\mathbf{R}\mathcal{A}$ the set of all retracts of $\mathcal{A}$. Then $\mathbf{R}\mathcal{A} \subseteq \mathbf{L}\mathcal{A}$. We will say that $\mathcal{A}$ *has easy direct limits* if every algebra from $\mathbf{L}\mathcal{A}$ is isomorphic to a retract of $\mathcal{A}$.

Finite algebras are with easy direct limits. We will present that:

- Vector spaces with easy direct limits are exactly finite dimensional ones.
- There is a simple algebra such that it has no easy direct limits.
- The additive group of rational numbers has easy direct limit and additive groups of integers and real numbers do not.

This is the joint work with Małgorzata Jastrzębska.