ADJUNCT TO THE POLYMORPHISM FUNCTOR

JAKUB OPRŠAL

The operator Pol which assigns to a relational structure the clone of all its polymorphisms is not a functor, nevertheless it can be turned into one. Namely, we fix a relational signature and define, for two relational structures $\mathbb{A}$ and $\mathbb{B}$ in this signature, $\mathrm{Pol}(\mathbb{A},\mathbb{B})$ as the set of all polymorphisms from $\mathbb{A}$ to $\mathbb{B}$, i.e., homomorphisms from a power of $\mathbb{A}$ to $\mathbb{B}$. The set of functions obtained in this way is not a clone, but is closed under taking minors (such sets are sometimes called clonoids). The resulting functor is contravariant in the first and covariant in the second variable. In the talk, we will focus on the adjoint of $\mathrm{Pol}(\mathbb{A},-)$ for a fixed relational structure $\mathbb{A}$, its connection with coloring of clones by relational structures, the lattice of linear Mal'cev conditions, and applications of this theory in the complexity of a promise version of constraint satisfaction problem.

Institute of Algebra, Technische Universität Dresden, 01062 Dresden, Germany