Algebraicity is irrelevant (in the dichotomy conjecture for infinite-domain constraint satisfaction problems)

Moritz Albert Schöbi

TU Wien

Abstract

The Bodirsky-Pinsker conjecture is an infinite counterpart to the Feder-Vardi dichotomy conjecture for Constraint Satisfaction Problems (CSPs) with finite templates. While the latter has been confirmed independently by Bulatov and Zhuk, the former remains wide open. In this talk, we shed light on two meta-problems regarding the scope of this conjecture. Our first result provides a significant structural simplification: we prove that the conjecture is equivalent to its restriction to templates without algebraicity, a crucial assumption in many powerful classification methods. The second result provides a simplification of algebraic nature: any algebraic condition characterizing any complexity class within the conjecture must be satisfiable by injections. In particular, this offers insight into which universal-algebraic conditions for the complexity of finite-template CSPs may be successfully lifted to the infinite case. This is joint work with Michael Pinsker, Jakub Rydval and Christoph Spiess.