

abstract

Computer Science/Discrete Mathematics Seminar I
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

Holant Problems are a broad framework to describe counting problems. The framework generalizes counting Constraint Satisfaction Problems and partition functions of Graph Homomorphisms.

We prove a complexity dichotomy theorem for Holant problems over an arbitrary set of complex-valued symmetric constraint functions \mathcal{F} , also called signatures, on Boolean variables. This extends and unifies all previous dichotomies for Holant problems on symmetric signatures (taking values without a finite modulus).

The dichotomy theorem has an explicit tractability criterion.

A Holant problem defined by \mathcal{F} is solvable in polynomial time if it satisfies this tractability criterion, and is $\#P$ -hard otherwise.

The proof of this theorem utilizes many previous dichotomy theorems on Holant problems and Boolean $\#CSP$. Holographic transformations play an indispensable role, not only as a proof technique, but also in the statement of the dichotomy criterion.