Linear Datalog ≠ Symmetric Datalog

László Egri¹, joint work with Benoît Larose² and Pascal Tesson³

Linear Datalog programs can be evaluated in non-deterministic logarithmic space (NL) and Dalmau characterized all constraint satisfaction problems (CSPs) whose complements are definable in linear Datalog [1]. He conjectured that linear Datalog might be a unifying explanation for families of CSPs lying in NL.

In [2] a new restriction of linear Datalog called symmetric Datalog has been identified. Symmetric Datalog programs can be evaluated in logarithmic space (L) using Reingold’s algorithm for the undirected ST-connectivity problem [3]. In [2] some classes of CSPs whose complements are expressible in symmetric Datalog are identified. Over the two-element domain and under a standard complexity-theoretic assumption, expressibility of ¬CSP(Γ) in symmetric Datalog corresponds exactly to the class of CSPs that can be evaluated in L. Symmetric Datalog might be a unifying explanation for families of CSPs lying in L.

In this talk we separate linear Datalog from symmetric Datalog by showing that ¬CSP({≤, {0}, {1}}) is definable in linear Datalog but not in symmetric Datalog.

References


¹McGill University, School of Computer Science, 3480 University Street, McConnell Engineering Building, room 318, Montréal, Québec, Canada H3A 2A7
²Concordia University, Department of Mathematics and Statistics, 1455 de Maisonneuve West, Montréal, Québec, Canada H3G 1M8
³Université Laval, Département d’Informatique et de Génie Logiciel, Pavillon Adrien-Pouliot, #3958, Québec, Québec, Canada G1K 7P4