Proposition de stage

Testing the Constraint Tractability Conjecture

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Titre : Testing the Constraint Tractability Conjecture

Thématique : algorithmique/combinatoire

Laboratoire : LIX, École Polytechnique

Ville : Palaiseau, France

Équipe/projet : Algorithmique et optimisation

Durée : 3-6 mois

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Présentation générale : Constraint satisfaction problems appear in many areas in computer science, for example in artificial intelligence, computational linguistics, scheduling, graph theory. It is a current research topic to classify the computational complexity of all finite domain constraint satisfaction problems. In 2000, Bulatov, Jeavons, and Krokhin presented an algebraic condition that implies that a constraint satisfaction problem is NP-hard (and thus can most likely be not solved efficiently). Moreover, they made the conjecture that all other constraint satisfaction problems are *tractable*, i.e., can be solved in polynomial time. This is the so-called *tractability conjecture*, and it is still open. Even though the tractability conjecture received quite some attention lately, and has been confirmed in many special cases, it has not yet been verified systematically by the help of computers for constraint languages on small domains.

Objectifs du stage : In this project, we want to implement procedures that

1. systematically generate interesting constraint satisfaction problems on small domains, and
2. test whether a constraint satisfaction problem satisfies one of the known conditions that imply tractability.

Candidates for this project should have some algorithmic experience ; experience in algebra are welcome, but not oligatory.