

Sujet: Reoptimization of Identifying Codes.

Directeurs de thèse: André Raspaud, Ralf Klasing.

Coordonnées: Andre.Raspaud@labri.fr, Ralf.Klasing@labri.fr

Équipe: Combinatoire et Algorithmique.

Thème: Graphes et Applications.

Descriptif: In a graph $G = (V, E)$, an identifying code of G is a subset of vertices $C \subseteq V$ such that $N[v] \cap C \neq \emptyset$ for all $v \in V$, and $N[u] \cap C \neq N[v] \cap C$ for all $u \neq v$, $u, v \in V$, where $N[u]$ denotes the closed neighbourhood of u , that is $N[u] = N(u) \cup \{u\}$. These codes model fault-detection problems in multiprocessor systems and are also used for designing location-detection schemes in wireless sensor networks.

The goal of this thesis is to investigate dynamic aspects of Identifying Codes. The main focus will be to apply the concept of reoptimization in this context. Given an instance of an optimization problem together with an optimal (or near-optimal) solution, one wants to find a high-quality solution for a locally modified instance. The general concept of reoptimization was first introduced and investigated for the Travelling Salesman Problem and the Steiner tree problem (see [1] for a survey). The goal of this thesis will be to investigate the concept of reoptimization for the problem of computing identifying codes. As the computation of minimum identifying codes is hard to approximate in the non-reoptimization scenario [2], the goal in this line of research will be to see whether similar hardness results hold also for the reoptimization variant of the problem.

References:

- [1] H.-J. Böckenhauer, J. Hromkovic, T. Mömke, P. Widmayer: On the Hardness of Reoptimization. SOFSEM 2008: 50-65.
- [2] S. Gravier, R. Klasing, J. Moncel: Hardness results and approximation algorithms for identifying codes and locating-dominating codes in graphs. Algorithmic Operations Research, 3(1):43–50, 2008.

Remarque: Ce sujet de thèse de Doctorat a été retenu en CS au LaBRI.