

Oberseminar Theoretische Informatik
Sommersemester 2009

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The Parameterized Complexity of Some Minimum Label Problems

Mo. 08.06.2009 um 14:00 (c.t.) im Seminarraum 3319 (Ernst-Abbe-Platz 2,
3. Stock).

We study the parameterized complexity of several minimum label graph problems, in which we are given an undirected graph whose edges are labeled, and a property Π , and we are asked to find a subset of edges satisfying property Π that uses the minimum number of labels. These problems have a lot of applications in networking. We show that all the problems under consideration are $W[2]$ -hard when parameterized by the number of used labels, and that they remain $W[2]$ -hard even on graphs whose pathwidth is bounded above by a small constant. On the positive side, we prove that most of these problems are FPT when parameterized by the solution size, that is, the size of the sought edge set. For example, we show that computing a maximum matching or an edge dominating set that uses the minimum number of labels, is FPT when parameterized by the solution size. Proving that some of these problems are FPT is nontrivial, and requires interesting and elegant algorithmic methods that we develop in this paper.

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