

Landelijk Netwerk Mathematische Besliskunde

Combinatorial Optimization 2a

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Fourth series. Exercises 9 and 10.

Please send your solutions by November 23, 2011

Exercise 9. Find a kernelization for the following problem with parameter k : An instance consists of an $n \times m$ matrix A with entries in $\{0, 1\}$, and an integer k . The problem is to decide whether there exists a subset S of k of the 1-entries of A , such that every 1-entry in A lies in the same row or the same column as some 1-entry in S .

Exercise 10. In the scheduling problem $P||C_{\max}$, a system of m parallel identical machines has to process jobs J_1, \dots, J_n with processing times p_1, \dots, p_n . The goal is to find a schedule that minimizes the makespan.

Design an $O^*(2^n)$ time exact algorithm for $P||C_{\max}$.