

Advanced Techniques for Combinatorial Algorithms

Gianluca Della Vedova — Raffaella Rizzi

2017–18

1 Parallel Algorithms

Given an undirected edge-weighted connected graph $G = (V, E)$, find a minimum-weight subset $T \subseteq E$ such that T is a tree spanning V .

2 Approximation Algorithms

Prove the correctness of the $(1 - \frac{1}{e})$ -approximation algorithm for MAX SAT, by showing that $E[W] \geq \beta_k w_c z_c^*$, with $\beta_k = 1 - (1 - \frac{1}{k})^k$.

3 Approximation Algorithms

Describe an $O(\log n)$ -approximation algorithm the problem of finding the minimum-weight set of $2CNF \equiv$ clauses to be deleted in order to obtain a set of clauses that are all satisfiable. The instances of this problem consists of a set of clauses of the form $u \equiv v$, where both u and v are literals. Moreover, each clause c has a weight $w(c)$.

The algorithm should be mainly a reduction to the multicut problem.