

Exercise Set 7

Exercise 7.1. Consider the DIRECTED STEINER TREE PROBLEM: Given an edge-weighted digraph $G = (V, E)$, a set of terminals $T \subseteq V$ and a root vertex $r \in V$, find a minimum weight arborescence rooted at r that contains every vertex in T .

Show that a k -approximation algorithm for the DIRECTED STEINER TREE PROBLEM can be used to obtain a k -approximation algorithm for MINIMUM WEIGHT SET COVER.

(5 points)

Exercise 7.2. Show that for any $\varepsilon > 0$, a k -approximation algorithm for the unweighted Steiner tree problem can be used to obtain a $(k+\varepsilon)$ -approximation algorithm for the Steiner tree problem with nonnegative integral edge weights.

(5 points)

Deadline: Tuesday, June 4th, before the lecture. The websites for lecture and exercises can be found at:

http://www.or.uni-bonn.de/lectures/ss24/appr_ss24_ex.html

In case of any questions feel free to contact me at blauth@or.uni-bonn.de.