Prof. Dr. Christian Scheideler
Universität Paderborn

Paderborn, December 10, 2019

Advanced Algorithms

WS 2019

Homework Assignment 9

Problem 22:
Use randomized metric reduction in order to show that the TSP problem on n nodes whose pair-wise distances are given by any metric d has an approximation algorithm with an expected approximation ratio of $O(\log n)$.

Problem 23:
In the *communication spanning tree problem* we are given an undirected graph $G = (V, E)$ with edge costs $c : E \to \mathbb{N}$ and the goal is to find a spanning tree $T = (V, E')$ of G that minimizes the sum of the pairwise distances with respect to T over all pairs of nodes. Show that there is an $O(\log n)$-approximation algorithm for this problem using the metric reduction approach.

Problem 24:
Prove Theorem 6.5 in Chapter 6 of the lecture notes.