

DM833 – Weekly Note 3

Lectures in week 17

Monday, April 22

- Consider the following algorithm for finding a TSP tour in a graph with metric edge weights:
Vertices are added to the cycle one by one.
In each step, the vertex added is a vertex v whose distance to any of the vertices already in the cycle is minimum.
Assume that the vertex closest to v is u . Then, v is added to the cycle just after u .
Prove that the algorithm is a 2-approximation algorithm.
Hint: Note the similarity to Prim's algorithm for finding a minimum spanning tree.
- Let G be a complete undirected graph with nonnegative edge weights. Consider the following transformation:
Let W be the maximum weight in G .
For each edge e , add W to the weight of e .
Call the resulting weighted graph G' .
 - Argue that the weights in G' are metric.
 - Argue that a TSP tour in G is optimal, iff the corresponding tour in G' is optimal for G' .
 - Does this contradict Theorem 3.6?
- Section 5.0 and 5.1: The k -Center Problem and parametric pruning

Tuesday, April 23

No lecture

Wednesday, April 24

- Exercise 3.3
- Exercise 4.2
- Chapter 8: The Knapsack Problem