Asymmetric Traveling Salesman

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1 Introduction

Given a graph G=(V,E) and a cost function $C : V * V -> R$, the traveling salesman problem tries to find a simple cycle with minimum total length that visit each vertices of the graph once.

The general type of this problem (TSP) is NP-Hard. In the case that the cost function is symmetric there exist an (3/2)-approximation algorithm. The algorithm seeks for a minimum spanning tree in the graph and then tries to find a matching on the odd-degree vertices of the graph.

In the Asymmetric Traveling Salesman the weight function is not symmetric ($C(i, j) \neq C(j, i)$). There is a O(log n/ log log n)-approximation algorithm for the asymmetric version of the problem.

2 Objective

Studying the papers in the reference list and understand their algorithm. Try to find a better approximation algorithm / write a survey paper based on my findings.

3 Related Papers to read

[1] N. Christofides. Worst case analysis of a new heuristic for the traveling salesman problem. Report 388, Graduate School of Industrial Administration, Carnegie-Mellon University, Pittsburgh, PA, 1976.

[2] A. M. Frieze, G. Galbiati, and F. Maffioli. On the worst-case performance of some algorithms for the asymmetric traveling salesman problem. Networks, 12:23–39, 1982

[3] An O (log n/log log n)-approximation Algorithm for the Asymmetric Traveling Salesman Problem.

[4] A randomized rounding approach to the traveling salesman problem