Master's Thesis Defense

The Prize-Collecting Steiner Tree Problem and Related Problems

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What's on the menu?

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1. Introduction
2. The Prize-Collecting Steiner Tree Problem
3. Other Ways of Collecting Prize
4. The Median Tree Problem
5. Summary

Overview

What happened in the last six months?

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  - *Problem: articles are often too short and it's difficult to get an overview.*
  - *Solution: write a survey.*
- I looked

Motivation

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Problem Definition

Given an undirected graph

$$G = (V, E, c, p)$$

where $c : E \to \mathbb{R}^+$ defines edge weights, and $p : V \to \mathbb{R}^+$ defines vertex *prizes*, then the solution to the *PCSTP* is a tree

$$T = (V_T, E_T, c, p) \subseteq G$$

which minimizes

$$c(T) = \min_T GW(T) = \sum_{(i,j) \in E_T} c_{ij} + \sum_{v \in (V \setminus V_T)} p_v.$$

Applications

??

Solution Traits

Prize-Collecting Tours

haha

Median Subgraphs

haha

Problem Definition

Let $G = (V, E, c, d)$ be an undirected graph. Denote $c : E \to \mathbb{R}^+$ as an *edge cost* function and $d : V \times V \to \mathbb{R}^+$ be an *assignment cost* function where we have

$$d_{ii} = 0.$$

Then the *Median Tree Problem* is defined as finding a *connected subgraph* $T = (V_T, E_T)$ of G where $V_T \subseteq V$ and $E_T \subseteq E$ which minimises the cost function,

$$c(T) = \sum_{ij \in E_T} c_{ij} + \sum_{i \in V} \min_{j \in V_T} d_{ij}.$$

Why?

haha

The Solver

Results

What did I manage to do?

haha

Further Work

haha

Conclusion

haha