

A Combinatorial Optimization Primer

Notes for Mathematics 69.382*

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Chapter 0 Introduction

Chapter 1 Minimum Weight Paths and Spanning Trees

- 1.1 Basic Ideas
- 1.2 Non-negative Weights
- 1.3 The General Case
- 1.4 Predecessor Subgraph and Negative Weight Cycles
- 1.5 Examples
- 1.6 Minimum Spanning Trees

Chapter 2 Maximum Flow in a Network

- 2.1 Flows in Networks
- 2.2 Augmenting Paths
- 2.3 Cuts in a Network
- 2.4 The Augmenting Path Algorithm for Max-Flow
- 2.5 Implementation and Performance [Not yet Available]
- 2.6 Applications [Not yet Available]

Interlude Linear Programming Formulations of Some Combinatorial Problems

Chapter 3 Maximum Flow by Pre-flow Push

- 3.1 Pre-flows and Distance Labellings
- 3.2 Preflow Push Algorithms
- 3.3 Performance

Chapter 4 Min-cost Flows

- 4.1 Minimum Cost Flow Problems
- 4.2 The Incremental Network
- 4.3 Algorithm for Min-cost Flow
- 4.4 Another Min-cost Flow Algorithm
- 4.5 Application