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Perfect Graph Recognition and Coloring

Master Thesis

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Abstract

TODO

Contents

1 Perfect Graphs

Definition of perfect graphs.

Why are they interesting (Some examples of subclasses, and problems that are solvable for perfect graphs, including recognition and coloring).

Weak perfect graph theorem.

Berge graphs.

1.1 Strong Perfect Graph Theorem

Cite the paper, brief description of the theorem.

2 Recognizing Berge Graphs

Cite the paper.

2.1 Recognition algorithm Overview

Recognizing simple structures (Diamonds, Jewels, T1, T2, T3).

Finding and Using Half-Cleaners.

Overview of proof of why algorithm using Half-Cleaners is correct.

2.2 Implementation

Anything interesting about algo/data structure?

Optimizations - Bottlenecks in performance (next path, are vectors distinct etc).

Validity tests - unit tests, tests of bigger parts, testing vs known answer and vs naive.

2.3 Parallelism with CUDA (?)

TODO

2.4 Experiments

Naive algorithm - brief description, bottlenecks optimizations (makes huge difference).

Description of tests used.

Results and Corollary - almost usable algorithm.

3 Coloring Berge Graphs

3.1 Ellipsoid method

Desctiption.

Implementation.

Experiments and results.

3.2 Combinatorial Method

Cite the paper.

On its complexity - point to appendix for pseudo-code.

Appendices

A Perfect Graph Coloring algorithm

TODO