Project block 1.3

Find the smallest range for the chromatic number of a graph

Group 10

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Summited: Wednesday January 23, 2019

Maastricht University

Department of Data Science and Knowledge Engineering

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Project coordinator: Prof. Jan Paredis

Preface

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Abbreviations and symbols

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Methods

2.1 Decomposing the graph

Divide the graph into disconnected parts
Use breadth-first search
Usage: Allow other methods to work on smaller graphs

2.2 Greedy algorithm

Sort the vertices based on their constraints
Try to reuse available colors
Usage: Find the upper-bound

2.3 Lower-bound

2.4 Special cases

2.4.1 Bipartite

Use breadth-first search
Chromatic number = 2

2.4.2 Odd cycle

Chromatic number = 3

2.4.3 Complete graph

Check if every vertex is connected to all other vertices
Chromatic number = number of vertices

2.5 Genetic algorithm

2.5.1 Fitness function

Based on the number of invalid colorings of each graph

2.5.2 Selection method

2.5.3 Crossover

2.5.4 Mutation

2.6 Brute force search

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