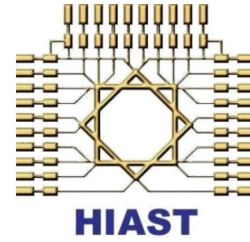


Syrian Arab Republic

Higher Institute for Applied Sciences and Technology

Informatics Department

Fourth Year



Using Genetic Algorithms to Find Approximations for the Minimum Vertex Cover Problem

Keywords: genetic algorithms, NP-complete, combinatorial optimization,
non-deterministic algorithms, approximation algorithms, minimum vertex cover.

Author: *Farouk Hjabo*

Academic Supervisor: *Dr. Said Desouki*

General Supervisor: *Dr. Kadan Aljoumaa*

Langauge Supervisor: *Mr. Fahmi Alammareen*

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Abstract

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1 Introduction

Once the NP-hardness of a combinatorial optimization problem is established, the search for an optimal solution is abandoned. The goal then becomes one of finding a good heuristic, i.e. a polynomial running time algorithm that can find solutions close to the optimal. In most cases, traditional heuristics are problem dependent; a heuristic is tailored to the specific problem it is trying to solve.

In this paper, we present an alternative approach that uses genetic algorithms as a generalized heuristic for solving NP-hard combinatorial optimization problems. The application of a genetic algorithm is demonstrated here for the *minimum vertex cover* problem. These algorithms have been successfully applied to a broad range of problems. This wide range can be tackled by genetic algorithms mainly due to the fact that they work with an encoding of the domain rather than with the problem domain itself.

2 Genetic Algorithms

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3 The Minimum Vertex Cover Problem

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4 Experimental Results

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5 Conclusion

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