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DECLARATION

I declare that the dissertation hereby submitted to the University of Limpopo for the degree of Masters Science has not previously been submitted by me for a degree at this or any other university, that it is my own work in design and execution, and that all material contained therein has been duly acknowledged.

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ABSTRACT

This study is focused on the scheduling of minibus (taxi) transport between the City of Polokwane and Mankweng Township in the Limpopo province of South Africa. New formulations of integer programming for taxi timetabling problems were presented. The problem is modeled as a single link transit. Hard and soft constraints have been identified.

The main objective of the study is to design the best schedule that minimizes the waiting time of passengers and provides better service to the public for taxi transport on the aforementioned link.

In this study the proposed solution methods managed to produce a timetable with a non-conflicting set of taxis and no consecutive assignment of one taxi to the trips within a duration time (total time traveled on a return trip between two locations). Local search algorithms such as the Genetic Algorithm are used in the research, mainly due to its flexibility and power to produce the best solution to the timetabling problems. The algorithm starts with a population of a feasible search space. Two operators: mutations and crossovers, were designed in such a way that they do not produce infeasible offspring.

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ACRONYMNS

1. CBD: Central Business District.
2. UL: University of Limpopo.
3. GMTA: Greater Mankweng Taxi Association.
4. UTP: University Timetabling Problem.
5. CTP: Course Timetabling Problem.
6. ETP: Examination Timetabling Problem.
7. GA: Genetic Algorithm
8. SA: Simulated Annealing
9. TS: Tabu Search.
10. TTP: Train Timetabling Problem.
11. VTP: Vehicle Timetabling Problem.
12. VSP: Vehicle Scheduling Problem.
13. ATP: Airline Timetabling Problem.
14. BSP: Bus Scheduling Problem.
15. BCSP: Bus Crew Scheduling Problem.
16. RCP: Robust Colouring Problem.
17. IP: Integer Programming
18. SPP: Set Partitioning Problem

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