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"O Problema de Roteamento Periódico de Veículos: Uma abordagem via Algoritmos Genéticos"

This dissertation propose the use of a Genetic Algorithm (GA) to find near optimal solutions to the Periodic Vehicle Routing Problem (PVRP), in particular the periodic vehicle routing problem with capacity and using a homogeneous fleet.

In the study of the periodic vehicle routing problem was made a detailed description about the problema, including: definitions, mathematics formulations and a bibliographic revision of the main existing heuristical approaches. Was evident the predominance of the utilization of heuristics proper of the complexity of this problem (NP-Hard).

In relation to genetic algorithms, was made a literature survey of this metaheuristic, since historic aspects until the description of its main components.

From this literature survey, was obseved that though very explored, few models use metaheuristics to solve PVRP and no work using Gas.

This work proposes a non-conventional genetic algorithm that uses a novel structure to encode feasible solutions. Two vectors are employed, the first to represent the solution, and the second to guarantee the feasibility of this solution.

In the computational tests made, were used problems instances used in several works in the literature, and the solutions found were compared with other approaches. Also presented a study to determine the best values for the parameters used in genetic algorithm. The quality os the solutions found confirm the efficiency of the proposed genetic algorithm to solve this problem.