



Research School for Operations
Management and Logistics

Exact and Heuristic Methods for the Capacitated m-Ring-Star Problem (CMRSP)

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The CmRSP has many applications in telecommunication systems, in particular in urban fibre optic communication networks. The problem consists of finding m rings (simple cycles) visiting a central depot, a subset of customers and a subset of potential (Steiner) nodes, while customers not belonging to any ring must be allocated to a visited (customer or Steiner) node. Additionally, the rings must be node-disjoint and the number of customers allocated or visited in a ring cannot be greater than the capacity Q (an input parameter). The objective is to minimize the total visiting and allocation costs. The problem is a generalization of the Traveling Salesman Problem, hence it is NP-hard and different exact and heuristic algorithms are proposed in the literature to solve the problem. In our research, we want to develop new exact and metaheuristic algorithms to better solve the problem compared to the state-of-the-art solution methods, and test these methods on generalization of the CmRSP.