MODELING AND OPTIMISATION OF DISTRIBUTION NETWORKS USING HYBRID GENETIC ALGORITHMS: A COMPARATIVE STUDY

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TÓM TẮT:

This paper focuses on the second stage of a threestage, integrated methodology for modeling and optimisation of distribution networks based on Hybrid Genetic Algorithms. The methodology permits the use of any combination of transportation and warehousing costs for a deterministic demand. This paper analyses and compares the variation of overall costs when the number of facilities varies and indicates how to minimize them. The distribution network directly and critically affects costs, efficiency and service level - the essential performance operation indicators for supply chains. The paper concentrates on Capacitated Location Allocation of distribution centers, a large scale, highly constrained, NP-hard, combinatorial problem. The Hybrid Genetic Algorithm used has a classical structure, but incorporates a special encoding of solutions as chromosomes and the integration of a Linear Programming/Mixed Integer Programming module embedded in the generation, crossover and pseudo-mutation operators. A complex and extensive case study – 25 production facilities, 5 to 10 distribution centres and 25 retailers (up to 520 variables intricately connected with a significant number of constraints) – is described, demonstrating the robustness of the Hybrid Genetic Algorithm and the optimization approach.