HEURISTIC APPROACHES FOR SOLVING HUB LOCATION PROBLEM

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ABSTRACT

THE LOCATION OF HUB FACILITIES IS FUNDAMENTAL TO THE DESIGN OF A "HUB-AND-SPOKE NETWORK", AS IT GREATLY AFFECTS THE TOTAL TRANSPORTATION COSTS OF SYSTEM. HUB IS A SPECIAL TYPE OF FACILITY, WHICH IS DESIGNED TO ACT AS SWITCHING POINT FOR INTERNAL FLOWS OF A NETWORK. THE PROBLEM IS TO DETERMINE THE OPTIMAL LOCATION FOR THE HUBS AND THE ASSIGNMENTS OF THE NONHUBS TO HUBS THAT MINIMIZES THE OVERALL TRANSPORTATION COST. DUE TO ITS CHARACTERISTICS OF NP-COMPLETE, IT IS DIFFICULT TO OBTAIN OPTIMAL SOLUTION WITHIN AN ACCEPTABLE AMOUNT OF TIME. IN THIS STUDY WE CONSIDER BOTH SINGLE AND MULTIPLE ALLOCATION HUB LOCATION PROBLEMS. A HEURISTIC ALGORITHM BASED ON A HYBRID OF SIMULATED ANNEALING (SA) AND TABU LIST IS DEVELOPED. BESIDES, A LAGRANGIAN RELAXATION APPROACH IS ALSO PRESENTED TO SOLVE THIS PROBLEM. BOTH HEURISTIC APPROACHES PRESENTED IN THIS STUDY COMPARE FAVORABLY WITH THE COMPUTATIONAL RESULTS OBTAINED FROM THE LITERATURE. THE RESULTS INDICATE THAT BOTH METHODS PROPOSED ARE CAPABLE OF OBTAINING GOOD SOLUTIONS IN A VERY SMALL AMOUNT OF TIME.

Keywords : HUB LOCATION PROBLEM, SIMULATED ANNEALING, LAGRANGIAN RELAXATION

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