

An Evolutionary Multi-Objective Optimization for Airport Gate Assignment Problem

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Abstract : Gate Assignment Problem (GAP) is one of the most substantial issues in airport operation. In principle, GAP intends to maintain the maximum capacity of the airport through the best possible allocation of the resources (gates) in order to reach the optimum outcome. The problem involves a wide range of dependent and independent resources and their limitations, which add to the complexity of GAP from both theoretical and practical perspective. In this study, GAP was mathematically formulated as a three-objective problem. The preliminary goal of multi-objective formulation was to address a higher number of objectives that can be simultaneously optimized and therefore increase the practical efficiency of the final solution. The problem is solved by applying the second version of Non-dominated Sorting Genetic Algorithm (NSGA-II). Results showed that the proposed mathematical model could address most of major criteria in the decision-making process in airport management in terms of minimizing both airport/airline cost and passenger walking distance time. Moreover, the proposed approach could properly find acceptable possible answers.

Keywords : airport management, gate assignment problem, mathematical modeling, genetic algorithm, NSGA-II

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