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ASSIGNMENT PROBLEM WITH FUZZY LINEAR PROGRAMMING

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An assignment problem is a particular case of a transportation problem where the objective is to assign several resources to an equal number of activities to minimize the total cost or to maximize the total profit of allocation. Hungarian algorithm is applied to solve the assignment problem with minimization or maximization problems. If there is an assignment problem with at least two or more objective functions, then there are conflicting objective functions to determine the optimal assignment schedule satisfying all the objective functions and constraints represented in the mathematical model. The Multi-Objective Fuzzy Linear Programming Problem in which all the parameters and variables are represented by fuzzy numbers is known as the Fuzzy Linear Programming Problem. A fuzzy number is characterized by a membership function. Various shapes of membership functions that can be applied to real-world planning are linear, nonlinear, triangular and trapezoidal. This study proposes the Multi-Objective Fuzzy Linear Programming Problem to solve an assignment problem with conflicting objective functions. The linear membership function is used to formulate the fuzzy constraints for the assignment problems. A hypothetical example is used to compare the Hungarian algorithm with the Multi-Objective Fuzzy Linear Programming algorithm. In this study, two problems are solved, where one with an objective minimization function and the other with a maximization objective function solved by applying the Hungarian algorithm. The optimal schedule obtained for the minimization problem is used to obtain the optimal solution for the maximization problem and *vice versa*. Then, the same problem is solved using the Multi-Objective Fuzzy Linear Programming algorithm to determine the optimal schedule and optimal solutions for maximization and minimization assignment problems. As a result, a feasible schedule and optimal solutions for maximization and minimization problems are obtained by applying the Multi-Objective Fuzzy Linear Programming algorithm.

Keywords: Assignment problem, Fuzzy Linear Programming, Fuzzy objective, Membership functions