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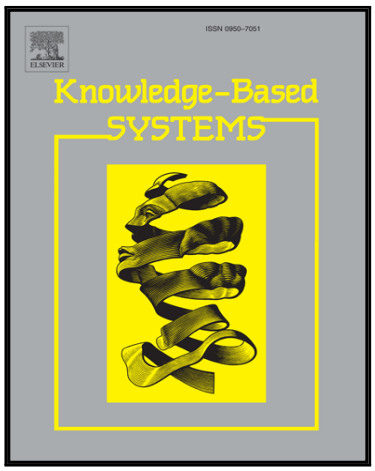


# A new trapezoidal fuzzy linear programming method considering the acceptance degree of fuzzy constraints violated

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# A new trapezoidal fuzzy linear programming method considering the acceptance degree of fuzzy constraints violated

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**Abstract:** The fuzzy linear program has various applications in knapsack problem, investment problem, capital budgeting problem, and transportation problem, etc. Considering the acceptance degree of decision maker that the fuzzy constraints may be violated, this paper develops a new method for the fuzzy linear program in which all the objective coefficients, technological coefficients and resources are trapezoidal fuzzy numbers (TrFNs). The order relationship for TrFNs is firstly given by using the interval expectation of TrFNs. According to the order relationship of TrFNs, the trapezoidal fuzzy linear program is transformed into the interval objective program. Combined with the ranking order relation between intervals and the acceptance degree of fuzzy constraints violated, the interval objective program is further transformed into the bi-objective linear program which is solved by the proposed goal programming approach. The proposed method of this paper is not only mathematically rigorous, but also can sufficiently consider the acceptance degree of the fuzzy constraints violated. The effectiveness and superiority of the proposed method are verified with a fuzzy knapsack problem and an investment problem. Finally, a decision support system is developed for the proposed method.

**Keywords**: Fuzzy linear program; Trapezoidal fuzzy number; Goal program; Acceptance degree

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