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ABSTRACT

Interval 0-1 Programming Problem and Product-Mix Analysis

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Recently many fuzzy mathematical programming methods were proposed as the decision making models under uncertainty. Fuzzy mathematical programming problems were formulated by replacing the coefficients of the conventional mathematical programming problems with the fuzzy number coefficients. In the formulations, it is not always easy to give a proper membership function to each fuzzy number coefficient. Thus we formulate a tractable problem called the interval programming problem by regarding the fuzziness of coefficients as intervals.

In this paper, an interval 0-1 programming problem with an interval objective function is formulated and analyzed to deal with a product-mix problem. First, two order relations between intervals are defined to maximize the interval objective function. The order relations are defined by the left and right limits of interval and by the center and width of interval, respectively. Furthermore the modified order relations to minimize the interval objective function are defined. Some properties of these order relations are investigated. Next, the interval 0-1 programming problem is formulated where a solution set is defined by the two order relations between intervals. A computational algorithm using the branch and bound method is proposed to obtain the solution set. Last, the interval 0-1 programming problem is applied to the product-mix problem where the demand of each product to be selected is estimated as an interval.