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A Multi-Objective Programming Model to Supplier Selection and Order Allocation Problem in Stochastic Environment

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Abstract : This paper aims at developing a multi-objective model for supplier selection and order allocation problem in stochastic environment, where purchasing cost, percentage of delivered items with delay and percentage of rejected items provided by each supplier are supposed to be stochastic parameters following any arbitrary probability distribution. In this regard, dependent chance programming is used which maximizes probability of the event that total purchasing cost, total delivered items with delay and total rejected items are less than or equal to pre-determined values given by decision maker. The abovementioned stochastic multi-objective programming problem is then transformed into a stochastic single objective programming problem using minimum deviation method. In the next step, the further problem is solved applying a genetic algorithm, which performs a simulation process in order to calculate the stochastic objective function as its fitness function. Finally, the impact of stochastic parameters on the given solution is examined via a sensitivity analysis exploiting coefficient of variation. The results show that whatever stochastic parameters have greater coefficients of variation, the value of the objective function in the stochastic single objective programming problem is deteriorated.

Keywords : supplier selection, order allocation, dependent chance programming, genetic algorithm
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