

# Bi-level programming model and genetic simulated annealing algorithm for inland collection and distribution system optimization under uncertain demand

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## ABSTRACT

With the continuous improvement of users' expectation of transportation quality and the continuous improvement of the transportation system in China, the inland collection system plays an increasingly important role in port development. Based on the demand change, this paper measures the disturbance of the demand change to the inland collection and distribution system from ports and customers, it establishes bi-level programming model for transportation route and transportation mode selection. The upper layer establishes the stochastic opportunity constrained programming model with the minimum cost of collection and distribution, the lower layer builds an optimization model with the goal of maximum customer satisfaction. The genetic simulated annealing algorithm is used to solve the bi-level programming model combined with specific examples and compared with genetic algorithm. The result shows that genetic simulated annealing algorithm can not only obtain the optimal solution, but also improve the speed of global convergence. The genetic simulated annealing algorithm is an effective algorithm to solve the bi-level programming model with multiple targets.

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