

Production-Distribution Network Design Problem with Partial Demand Information

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In this paper, we propose a new robust optimization model of a production-distribution network design problem with perishable products and partial demand information. Due to the limited historical data, the means and covariance matrix of the stochastic demand are only known; however, the distributions of the correlated nonidentically distributed demands are unavailable. According to the analysis of stochastic characteristics of partial demand information, the robust optimization model is transformed into a multi-period interval programming model in terms of a classification of uncertainty sets. By developing an improved stochastic linear programming model, the optimal interval solutions, including the production amounts of locations, the transportation flows, the inventory levels and the shipments, are obtained. Finally, numerical simulations were conducted to explore the effectiveness of the model and the influence of the correlated partial demand information on the solutions.