

基于商品供需网络的城市物流仓储设施均衡模型及应用

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Urban logistics storage facilities equilibrium model based on commodity supply and demand network and application

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摘要 城市物流仓储设施具有以商流为前提、物质需求为基础的网络特性。首先从价值流理论角度分析了从独立决策模型到交互决策模型的必要性和可行性, 利用变分不等式建立了包含物流仓储设施和商品供需成员的多层级供应链物流竞争超网络均衡模型, 得到了系统达到均衡的条件, 给出了经济解释和求解算法, 最后结合具体算例提供了验证求解和决策应用, 研究表明, 仓储设施层与商品供需层相互影响和制约, 设施效率改进、场址迁移等行为可能导致市场格局、商品流量和价格以及社会福利的有规律变动。

关键词: 城市物流 仓储设施 商品供需 网络均衡 变分不等式

Abstract: Urban logistics storage facilities have the nature of network based on commercial trend and demand. In this paper, we first analyze the necessity and feasibility to change the independent decision-making model into interact decision-making model from the perspective of the value stream. Then, we establish a network equilibrium model with the competition of the multi-level members of the supply chain logistics which include the logistics storage facilities and the supplier or demander of the commodity using the variational inequalities theory. Besides, we also get conditions which can make the system reach equilibrium and offer the economic interpretation and the solving algorithm. Finally, we validate the model and present its decision-making applications by solving the specific examples. It shows that storage facilities layer and layer of the commodity's supply and demand always influence and restrict each other, and the improvement of the facilities efficiency, the migration of the sites and other behaviors like these may lead to the regular change of the market pattern, the quantities of commodity, the prices and the social welfare.

Key words: urban logistics storage facilities commodity supply and demand network equilibrium variational inequalities

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