

Multi-level Programming-based Modelling and Its Optimization Methodology of Complex Hierarchical Supply Chains

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Considerable attention has been given to enterprise-wide supply chains these days. It is mainly due to the fact that globally distributed enterprises play a dominant role in the current manufacturing economies and operating such a large scale enterprise involves lots of complex decision-making problems. How to well address such problems decides the success of enterprises. In that sense, the importance of enterprise-wide supply chain planning problems should not be underestimated. This paper contributes by providing a multi-level programming framework in capturing complex supply chain decision making processes and proposing a novel solution methodology to compute the resulting multi-level programming problems. The proposed solution methodology transforms multi-level programming SCM problems into a series of bilevel programming problems. The key advantage of the proposed methodology is that the original problem is transformed into a family of single parametric optimization problems. A number of examples are solved to illustrate the proposed methodology.