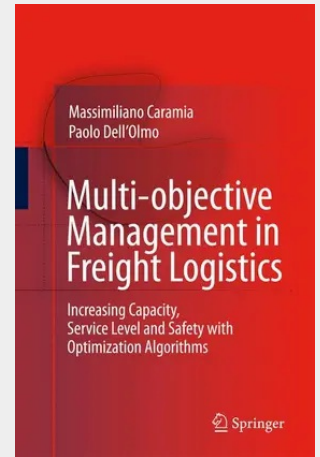


Multi-Objective Management in Freight Logistics: Increasing Capacity, Service Level and Safety with Optimization Algorithms

The content of this book is motivated by the recent changes in global markets and the availability of new transportation services. Indeed, the complexity of current supply chains suggests to decision makers in logistics to work with a set of efficient (Pareto-optimal) solutions, mainly to capture different economical aspects that, in general, one optimal solution related to a single objective function is not able to capture entirely. Motivated by these reasons, we study freight transportation systems with a specific focus on multi-objective modelling. The goal is to provide decision makers with new methods and tools to implement multi-objective optimization models in logistics. The book combines theoretical aspects with applications, showing the advantages and the drawbacks of adopting scalarization techniques, and when it is worthwhile to reduce the problem to a goal-programming one. Also, we show applications where more than one decision maker evaluates the effectiveness of the logistic system and thus a multi-level programming is sought to attain meaningful solutions. After presenting the general working framework, we analyze logistics issues in a maritime terminal. Next, we study multi-objective route planning, relying on the application of hazardous material transportation. Then, we examine freight distribution on a smaller scale, as for the case of goods distribution in metropolitan areas. Finally, we present a human-workforce problem arising in logistic platforms. The general approach followed in the text is that of presenting mathematics, algorithms and the related experimentations for each problem.

The complexity of modern supply chains requires decision makers in logistics to work with a set of efficient (Pareto optimal) solutions, mainly to catch different economic aspects for which one optimal solution related to a single objective function is not able to capture entirely. Motivated by this, and by recent changes in global markets and the availability of new transportation services, Multi-objective Management in Freight Logistics provides a detailed study of freight transportation systems, with a specific focus on multi-objective modeling. Multi-objective Management in Freight Logistics provides decision makers with new methods and tools to implement multi-objective optimization models in logistics. The book combines theoretical aspects with applications, showing the advantages and the drawbacks of adopting scalarization techniques, and when it is worthwhile to reduce the problem to a goal programming one. The book also shows applications where more than one decision maker evaluates the effectiveness of the logistic system and thus a multilevel programming approach is sought to attain meaningful solutions. Multi-objective Management in Freight Logistics opens by presenting the general working framework, and with analyses of logistic platforms and intermodality management in large scale transportation systems. This is then followed by a study of multi-objective route planning, based on the application of hazardous material transportation. Additionally, the book examines freight distribution on a smaller scale, as in the case of goods distribution in metropolitan areas. The general approach followed by the text is that of presenting both the network design and the tactical (planning) point of view, providing mathematics, algorithms and related experiments for each problem.



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