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 logistic 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.

Rome,  
Massimiliano Caramia  
May 2008  
Paolo Dell'Olmo