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Editorial

Modeling, Planning, and Control of Complex Logistic Processes

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In recent years, complex logistic processes and supply chains have been considered to be among the most important activities in the modern economy and societies, and it is well known that they are subject to many disturbances such as rapid shifts in customer demand, changes in orders, transportation congestion, and communications and machine failures. Obviously, their complexity is becoming increasingly more difficult to manage due to increasing numbers of production facilities linked by expanding global networks of transportation services. There are many different technologies emerging for helping to improve complex supply chain logistics, for example, sensor networks, mass data management, and decentralized control. This special issue targets active research in logistic processes and supply chains to provide an up-to-date overview of the research directions and advanced methods in the field. Of particular interest are the development of mathematical methodologies for modeling, optimization, and control of complex logistics networks. Topics are as follows:

(i) intelligence techniques, such as fuzzy logic and neural network approaches;

(ii) intelligent production and logistics systems;

(iii) effects of uncertainty in production networks;

(iv) mathematical modeling, robustness, and stochastic optimization of complex logistic processes;

(v) interrelation of demand forecasting and production planning;

(vi) decentralized control of logistic processes in production and distribution networks;

(vii) applications in complex logistics system.

The special issue attracted submissions from many institutes and countries. There are important results on the topic of production systems; for example, in the work entitled "Robust Production Planning in Fashion Apparel Industry under Demand Uncertainty via Conditional Value at Risk" by A. Ait-Alla et al., a mathematical model for robust production planning is introduced. The model helps fashion apparel suppliers in making decisions concerning allocation of production orders to different production plants characterized by different lead times and production costs and proper time scheduling and sequencing of these production orders. In the paper entitled "An Integrated Model for Production and Distribution Planning of Perishable Products with Inventory and Routing Considerations" by S. M. Seyedhosseini and S. M. Ghoreyshi, a new integrated production and distribution planning model for perishable products is formulated. The proposed model considers a supply chain network consisting of a production facility and multiple distribution centers. In the paper entitled "Application of Fuzzy Optimization to Production-Distribution Planning in Supply Chain Management" by S. Ariafar et al., a production-distribution model is presented that not only allocates limited available resources and equipment to produce products over the required time

periods, but also determines the most economical distributors for dispatching the products to the distribution centers or retailers. The goal of the paper entitled "An Uncertain Programming for the Integrated Planning of Production and Transportation" by D. Mou and X. Chang is to tackle joint decisions in assigning production and organizing transportation for a single product in a production-transportation network system with multiple manufacturers and multiple demands. The work entitled "A Multiobjective Optimization Model of Production-Sourcing for Sustainable Supply Chain with Consideration of Social, Environmental, and Economic Factors" by Z. Chen and S. Andresen incorporates the three pillars of sustainability, economic, environmental, and social dimensions, into a supply chain. Moreover, a multiobjective programming model that jointly minimizes costs, emissions, and employee injuries in a supply chain is constructed. In the work entitled "Application of Stochastic Regression for the Configuration of Microrotary Swaging Processes" by D. Rippel et al. the cause-effect relationships between relevant process parameters are analyzed using stochastic regression models in order to determine cost-efficient process configurations for the manufacturing of bulk and tubular microcomponents. In the paper "Multiobjective Order Assignment Optimization in a Global Multiple-Factory Environment" by R.-C. Chen and P.-H. Hung an effective method is presented for solving the order assignment problem of companies with multiple plants distributed worldwide. A multiobjective genetic algorithm (MOGA) is used to find solutions. To validate the effectiveness of the proposed approach, this study employs real data, provided by a famous garment company in Taiwan, as a base to perform experiments. In the paper "A Generalized Minimum Cost Flow Model for Multiple Emergency Flow Routing" by J. Cui et al., a novel generalized minimum cost flow model is presented for optimizing the distribution pattern of two types of flow in the same network by introducing the conflict cost.

In the context of logistics and transportation, in the paper entitled "A Transient Queuing Model for Analyzing and Optimizing Gate Congestion of Railway Container Terminals" by M. Zeng et al., the queue length and the average waiting time of the railway container terminal gate system, as well as the optimal number of service channels during the different time period, are investigated. In the paper entitled "Optimizing Gear Shifting Strategy for Off-Road Vehicle with Dynamic Programming" by W. Zhang et al., a dynamic programming (DP) algorithm is introduced to optimize the gear shifting schedule for an off-road vehicle by using an objective function that weighs fuel use and trip time. In the paper entitled "Adaptability of the Logistics System in National Economic Mobilization Based on Blocking Flow Theory" by X. Jing et al. a blocking-resistance optimum model and an optimum restructuring model based on blocking flow theories are constructed, both of which are illustrated by numerical cases and compared in characteristics and application. In the paper entitled "Unrecorded Accidents Detection on Highways Based on Temporal Data Mining" by S. An et al., a new method of detecting traffic accidents is proposed based on temporal data mining, which can identify unknown and unrecorded accidents by traffic police. A time series model was constructed using ternary numbers to reflect the state of traffic flow based on a cellular telephone transmission model. In the work entitled "Service Capacity Reserve under Uncertainty by Hospital's ER Analogies: A Practical Model for Car Services" by M. A. P. Salaverría and J. M. McWilliams, a capacity reserve model is introduced for dimensioning passenger car service installations according to the demographic distribution of the area to be serviced by using hospital's emergency room analogies.

Of course, the above topics and papers are not a comprehensive list of those covered by this special issue. Nonetheless, they represent the rich and many-faceted knowledge that we have the pleasure of sharing with the readers.

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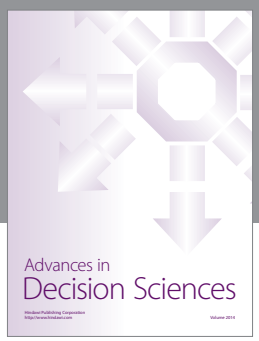

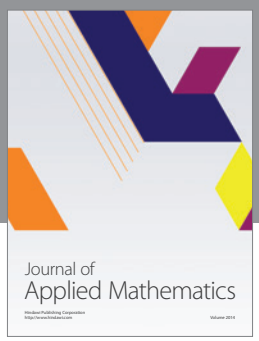

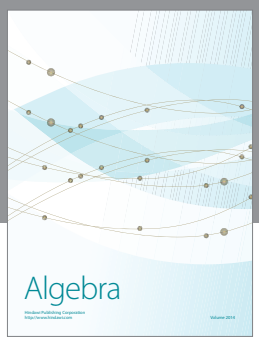

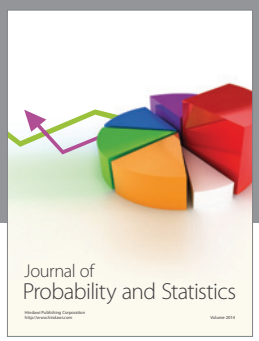

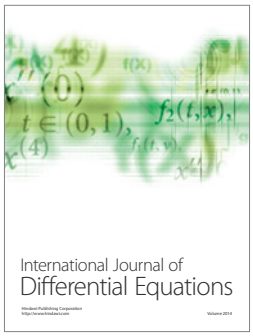

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