

ABSTRACTS**Robust Estimation in Nonlinear Modeling of Volatility Transmission in Stock Market****S.B. Ebrahimi***

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(Received: 12 September 2015; Revised: 8 May 2016;
Accepted: 24 June 2016)

Volatility transmission means the connection between different markets in a way that volatility can be transmitted from one market to another. The volatility of oil price in global markets is one of the factors which influence the capital markets of the countries of which their economy is based on oil revenues. Most of these markets have long-run memory characteristic which should be considered in modeling and estimation. In this paper the long memory effect in BEKK model which is one of the main Multivariate models of volatility spillover is considered and the Boudt & Croux (2010) approach is used for stable estimation of the model. The data used in this paper are daily returns of stock prices and oil prices in time interval December 2006 to January 2012. The paper investigate the influence of world oil price index on Dubai and Tehran stock markets in the strategic region of Middle East and also the mutual transmission between the two main trading partner of Iran and Emirates. The results indicate the volatility transmission from world oil market to Dubai and Tehran markets and also the transmission from Dubai market to Tehran market.

Keywords: Long memory, Pricing, Return, Robust estimation, Volatility transmission.

Truck Sequencing and Dock Assignment in a Cross-docking System**J. Arkat*, P. Qods and F. Ahmadizar**

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(Received: 24 April 2016; Revised: 15 May 2016;
Accepted: 31 May 2016)

In a supply chain, cross-docking is one of the most innovative systems for ameliorating the operational performance at distribution centers. Cross-docking is a logistics strategy in which freight is unloaded from inbound trucks and (almost) directly loaded into outbound trucks, with little or no storage in between, thus no inventory remains at the distribution center. In this paper, we consider the scheduling problem of inbound and outbound trucks with multiple dock doors, which the aim is to minimize the makespan. In this research, a mathematical model is derived to find the optimal solution. Also a Simulated Annealing algorithm is adapted to find near optimal solution, as the mathematical model will not be applicable for large scale problems. Numerical examples are presented in order to specify the efficiency of the proposed algorithm in comparison with mathematical model.

Keywords: Cross-docking, Door assignment, Simulated annealing algorithm, Truck scheduling.

Production and Transportation Scheduling and Allocation of Orders in the Supply Chain
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(Received: 7 March 2015; Revised: 14 January 2016;
Accepted: 16 April 2016)

In this paper a scheduling problem in a 2-stage supply chain is discussed. Suppliers are in the first stage and in the second stage, there are vehicles which carry orders to a manufacturing center. The purpose is to allocate orders to suppliers, sequence the suppliers' production, allocate orders to transport vehicles and prioritize orders that should be carried by vehicles to minimize the total time of the process and transportation. This issue has not yet been

discussed in the literature. First, a mixed integer programming mathematical model is presented. Then, in order to solve the problem, a new algorithm is proposed which is a new combination of genetic and Simulated Annealing Algorithms. To evaluate the performance of the algorithm, it is compared with one of the algorithms presented in the literature, genetic algorithm and simulated annealing algorithm, separately. Comparison results indicate the advantage of the proposed algorithm in comparison with other algorithms.

Keywords: Genetic algorithm, Scheduling, Simulated annealing algorithm, Supply chain, Transport planning.

Robust Model for Designing a Dynamic Closed-loop Supply Chain with Adjustable Capacity

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(Received: 27 July 2015; Revised: 30 May 2016; Accepted: 27 November 2016)

In this paper, firstly by using a mixed linear programming a new model of locating facilities with limited capacity is presented to design a closed-loop supply chain in a multi-product and multi-period mode. Then, using a robust optimization approach, the proposed model decreases in non-deterministic expansion. The results show that the proposed model can handle facility capacity in a closed loop logistics network. In addition, the results showed that the cost and time of test problems for the robust model is higher than the deterministic model.

Keywords: Capacity planning, Closed-Loop network, Robust optimization, Supply chain design, Uncertainty.

A Bi-objective Mathematical Model Toward Staff Planning Considering Cross-training

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(Received: 3 August 2015; Revised: 22 October 2015; Accepted: 28 April 2016)

In this paper, the staff assignment problem considering cross-training of caregivers in health care systems is addressed to determine which staff should be cross-trained for each service and how they should be assigned to services. A bi-objective non-linear mathematical programming model is presented where the first objective function aims to minimize workload balancing, cross-training as well as maintenance and transportation costs, while the second objective function is concerned with maximization of caregivers' satisfaction level. Several constraints with respect to budget capacity, staff absenteeism, maximum allowable consecutive shifts, multi-functionality and redundancy level and maximum allowable distance for transportation are taken into account to build a service plan. The behavior of the various elements and features of the model is evaluated in a real-world HC provider and the results reveal that the caregivers' workload is relatively balanced and the caregivers' preferences are satisfied.

Keywords: Cross-training, Health care systems, Optimization, Staff assignment.

Economic Order Quantity for Deteriorating Items with Imperfect Quality, Destructive Testing Acceptance Sampling, and Inspection Errors

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(Received: 14 October 2015; Revised: 14 May 2016; Accepted: 22 May 2016)

Now a days, management and control of perishable inventories is important in many units and industrial enterprises. Basically perishable inventory management and control is more complex and challenging than inventories with unlimited lifetime. Hence determining the optimal inventory policies for these products is very important. In this paper, the optimal inventory policy for perishable items given to the a single acceptance sampling plan with destructive testing and inspection errors is adopted .After developing a model for the problem and obtaining the objective function, first an exact solution and a simple and efficient algorithm to find the optimal values is proposed. Then, the model will be validated with a numerical example and senility analysis.

Keywords: Acceptance sampling, Destructive testing, EOQ, Inspection, Perishable items.

Providing a New Mathematical Model for School Service Routing with Considering Gender Separation

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(Received: 6 December 2015; Revised: 2 September 2016; Accepted: 26 November 2016)

In our country, school bus routes are determined by experiments of driver without considering the scientific optimum route and location. Traversing additional routes will always result an increase in vehicle movements and fuel consumption and enormous costs. Hence, this paper will study the school bus routing in Tehran considering special students and a model will be presented to minimize traveling distance and to prevent repetitive crossings through the bus stops and to determine the shortest routes by presenting a way to propel several students to a bus stop. The proposed model will solve via GAMS software. Because the model is NP-Hard, the Genetic algorithm is used to solve the large scale problem. The contribution of this paper is to consider gender separation in schools and buses. To solve this problem, an integer linear programming model is developed. The conclusion indicates a decrease in transportation time.

Keywords: Gender separation, Integer linear programming, School bus routing problem, Special students.

A Multiple Objective Programming Model for Designing of Supply Chain Network with Efficient Manufacturers and Distributors

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(Received: 14 September 2014; Revised: 3 May 2016; Accepted: 3 December 2016)

One of the most important decisions in supply chain network (SCN) design is choosing the optimal location for the facilities. The facilities in SCN have different efficiency according to their locations. In this paper, efficiency of facilities is added to the supply chain network design by using data envelopment analysis model, and a multi-objective model is presented for the design of efficient supply chain network. The proposed model chooses the most appropriate place for manufacturers and distributors thereby

decreases the total cost of the supply chain and simultaneously increases the efficiency. The desired supply chain has several raw materials and products, with four layers of suppliers, manufacturers, distributors and customers. The proposed model is locating manufacturers and distributors, and planning the purchase of any suppliers. The results of numerical example show that adding efficiency promotes the supply chain network model. Namely, with regard to the tradeoff between cost and efficiency objectives, SCN design with efficient facilities is better than networks based only on cost objective function.

Keywords: Efficiency, Data envelopment analysis, Multiple objective programming, Supply chain network design.

Stochastic Cell Formation Problem within Queuing Theory and Considering Reliability

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(Received: 22 February 2014; Revised: 11 January 2016;
Accepted: 22 May 2016)

In this study, the stochastic cell formation problem with developing model within queuing theory with stochastic demand, processing time and reliability has been presented. Machine as server and part as customer are assumed where servers should service to customers. Since, the cell formation problem is NP-Hard, therefore, deterministic methods need a long time to solve this model. In this study, genetic algorithm and modified particle swarm optimization algorithm are presented to solve problems. Because the metaheuristic algorithms quality depends strongly on selected operators and parameters, design of experiment is done for set parameters. The deterministic method of branch and bound algorithm is used to evaluate the results of

modified particle swarm optimization algorithm and the genetic algorithm. Evaluates indicate better performance of the proposed algorithms in quality the metaheuristic algorithms final solution and solving time in comparing with the method of Lingo software's branch and bound. Ultimately, the results of numerical examples indicate that considering reliability has significant effect on block structures of machine-part matrixes.

Keywords: Cell formation problem, Queuing theory, Reliability, Metaheuristic algorithm

Simultaneous Lot-sizing and Scheduling in Hybrid Flow Shop Production Environment with Resource Constraint

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(Received: 1 February 2015; Revised: 2 May 2016;
Accepted: 1 August 2016)

The aim of this Paper is to study a multi-product, multi-period production systems in a hybrid flow shop so that lot-sizing and scheduling will be determined simultaneously. A new mixed-integer programming model is proposed to formulate the studied problem. The objective function in this investigation includes the total cost of production, inventory and external supply. In the case of not satisfying the demand of customers, this demand should be met by foreign suppliers with higher price. The simultaneous lot-sizing and scheduling problem are classified in strongly NP-hard class. Due to the high computational complexity of the studied problem, particle swarm optimization (PSO) and imperialist

competitive algorithms (ICA) are implemented for solving the considered problem. The algorithms explore the solution space for both lot-sizing and scheduling and find a combination of production plan and sequence that is feasible and close to optimum. First, the implemented algorithms are used for solving randomly generated instances with different sizes. Then, these methods are used to solve the case of tile industry and the obtained results by two methods are compared with each other. Computational experiences show that the algorithms are able to achieve good-quality solutions for the problem in a reasonable time. Also, the results of ICA are better than PSO results for the mentioned case study.

Keywords: Hybrid flow shop production system, Imperialist competitive algorithm, Machine capacity constraint, Mathematical modeling, Particle swarm optimization, Simultaneous lot-sizing and scheduling.

A Hierarchical Multimodal Hub Location Model with Maximum Allowable Delay (Case Study: Iran)

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(Received: 7 December 2014; Revised: 1 May 2015; Accepted: 28 December 2015)

In this study, a hierarchical hub location problem by considering different modes of transportation and maximum allowed delay is investigated. This study is done on Iran's express postal service with 2 days maximum delay in delivery considering ground and airport hubs. The problem is of the type of location and single allocation for collection, transfer and distribution of the shipments. All the hubs are of limited capacity and there is a penalty for violation of the maximum allowed delay. The strategic goal of the model is to determine the location of ground and airport hubs and the allocation of links to these hubs by which the delay is minimized and the total cost of the system is optimized. The model

is linear mixed-integer programming. Finally, a case study to implement the model in Iran's postal service is conducted, and a sensitivity analysis is done using GAMS software.

Keywords: Capacitated hubs, Hierarchical hub location problem, Hub location problem, Single allocation.

Sustainable Construction Project Portfolio Selection under Interval- Valued Type-2 Fuzzy Sets

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(Received: 21 September 2015; Revised: 8 May 2016; Accepted: 1 August 2016)

Choosing the right set of projects is the first step of project oriented firms in strategic project portfolio management. Since economic growth depends on environmental and social issues, sustainable development has been an essential part of firms' plans to keep their competitive advantage. Moreover, market conditions, fast worldwide changes and other similar issues have given these issue ever-growing uncertain elements. As a result, this paper provides a method of sustainable construction-project portfolio selection under interval-valued type-2 fuzzy sets. This method consists of two main parts. The first level evaluates the proposed projects and omits the unsuitable ones. Then, in the second level, the portfolio is selected by means of mathematical programming. Eventually, to display applicability of the method, an application example is presented and solved.

Keywords: Construction projects, Mathematical programming, Project portfolio selection, Sustainable development, Type-2 fuzzy sets.

Solving a Fuzzy Multi-objective Aggregate Production Planning Model with Learning and Deterioration Effects by Using Genetic and Tabu Search Algorithms

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(Received: 14 October 2015; Revised: 25 September 2016; Accepted: 4 November 2016)

In this paper a non linear integrated fuzzy multi-objective production planning model with the labor learning and machines deterioration effects is presented. The objective function consists of two quantitative objectives namely increase profits and reduces the cost of system failure and a qualitative objective namely increases the satisfaction rate of the customers. Different weights for objectives and modification of the objectives by using fuzzy goal programming method are considered to convert the fuzzy multi-objective model to a deterministic single-objective model and the obtained model is solved by Genetic algorithm and Tabu search algorithm. Finally, the solution obtained from two algorithms compared together by using hypothesis test of equality of means. Experimental results show the proposed Genetic algorithm for solving the model has higher performance than the Tabu search algorithm.

Keywords: Aggregate production planning, Fuzzy goal programming, Genetic algorithm, Multi-objective programming, Tabu search algorithm.