

ABSTRACT**Development of Pricing Model for Deteriorating Items with Constant Deterioration Rate Considering Replacement**
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Choosing an appropriate inventory control policy and determining the optimal price for the items have always been one of the main topics of scientific research and industry. On the other hand, there are many products in the market which are classified as deteriorating items. Therefore, the problem of determining optimal price and inventory policies for these types of items are very important. In this paper a three-echelon supply chains consisting of a manufacturer, a distributor and a retailer are considered. There is only a single type of item with constant deterioration. Demand is deterministic and replenishment is instantaneous. The purpose of this study is increasing the total profit by determining the optimum values of the product price (p) and ordering cycle (T) of distributor. Since the products are deteriorating, some part of the initial stored inventory is lost. Therefore, distributor disposes the spoiled items and replaces them with the same amount of sound items. The replacement in the warehouse of the distributor is also instantaneous. Finally, numerical examples are presented to elaborate the model and sensitivity analysis performed on the values of some parameters.

Keywords: Deteriorating items, Pricing, Replacement, Supply chain.

Designing Dynamic Demand Networks Considering Agility and Security Measures
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Today quick responsiveness to existing variable demands and required flexibility is one of the most important problems in complex industries. Decisions related to the opening the facilities in the manufacturing networks and their allocations and transportation of the orders can be considered as main strategic concerns in this area. In the present study, a multiple objective mixed integer mathematical programming model has been represented to determine optimal location and allocation decisions. The objectives are site dispersion, transportation costs, fixed and variable costs of establishments. Goal programming method as one of the most applicable approaches in multi objective optimization has been applied. Decisions associated to activation of each facility at a multi-period horizon and optimal allocation are included in the model. Finally, a numerical example has been analyzed to illustrate the performance and the mechanism of the proposed model.

Keywords: Agile design, Goal programming, Multiple objective programming, Multi-period-multi commodity networks.

Application of Image Processing Concept for Identifying Product Line Defects (Case Study: Shiraz Vegetable Oil Company)**S.M.A. Khatami Firouzabadi***

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Nowadays, intense competition and high cost of production cause the loss reduction and waste recovery as one of the most concern of industrial and production companies and factories. The aim of this study is to use an image processing model to recognize the defect in the product line. As a case study, oil bottles produced by Shiraz Vegetable Oil Company are used. Input data program is the images of the intact and defected oil bottles and output is the final judgment of program about the correctness of the bottles. Image processing is performed using software MATLAB. In this study, two different procedures are used to identify the perfect and defective oil bottles. The first theory is based on the comparison of the area of perfect and defective bottle images. The second theory compares the ratio of the height to the sum of some widths for two different images. Second theory uses edge function algorithm and the result obtained from this theory is more accurate with respect to the first theory.

Keywords: Defects, Edge detection algorithm, Image processing, Oil bottle, Recovery.

Prioritizing Interrupt Causes in Laparoscopic Surgeries Based on Identifying Causal Relations between Interrupt Causes

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Laparoscopy or minimally-invasive surgery is a surgical technique in which the surgical operations are performed via a few small incisions. This kind of surgery has fewer complications over open surgery. Finding methods for shortening the time of laparoscopic surgeries can improve resource and staff efficiency and reduce costs. An approach to shortening the time of laparoscopic surgeries is identifying the interruptions in these surgeries and preventing from their occurrence or reducing the potential of occurrence of the identified interrupt causes. In this paper, the interrupt causes of laparoscopic surgeries are prioritized based on the identified causal relations between interrupt causes. Research population is the laparoscopic surgeries performed in Hasheminezhad kidney center in May-June 2013. For this purpose, 25 laparoscopic surgeries are observed in this hospital in this time interval. Causal relations among interrupt causes are identified from the gathered data. Experimental results show that the most important interrupt causes in laparoscopic surgeries are staff shortage or multi-tasking staff, foggy lens, unavailable surgical instruments, dirty lens and finally low-experienced staff. Moreover, sensitivity analysis on criteria weighting show that the mentioned interrupt causes are the five most-important interrupt causes in more than 80% of the evaluated scenarios. By application of this research, one can improve the productivity of operational room in this kind of surgery.

Keywords: Causal relations, Interruptions, Laparoscopic surgery, Multi attribute decision making.

A Unified Performance Evaluation Model in Competitive Environment by Combining of Data Envelopment Analysis, Balanced Scorecard and Game Theory-case Study: Cement Companies

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In this paper, a comprehensive and simplified model for industries' performance evaluation and performance measurement is proposed. We use the balanced scorecard as a framework for the continuous DEA models. This means that we used four output-oriented DEA models with variable returns to scale, for each of the four aspects of BSC and used the indicators tailored to each BSC aspects as inputs and outputs of DEA models. In this model, we use the bargaining game theory to show the impact of bargaining power of units in the competitive environment. Thus, we offer a holistic approach to evaluating and improving the performance of the industries in a competitive environment. Finally, by providing a case study of 17 cement companies of the holding of Shasta, model has been run and the solutions have been determined to improve the poor performance of each units.

Keywords: Balanced scorecard, Cement companies, Data envelopment analysis, Nash bargaining game theory, Performance evaluation.

A Green Closed Loop Supply Chain Network Design Considering Operational Risks under Uncertainty and Solving the Model with NSGA II Algorithm

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In today's growing competitive environment, supply chain management has been widely focused by firms as a critical issue. Consequently, the organization's activities are influenced in order to

achieving quality improvement, cost reduction and customer satisfaction in production process. Recently, pollution and greenhouse effects have focused the researchers' attention on planning and executing networks in which environmental problems and economical aspects are considered simultaneously. In this paper, a multi-layer, multi-product and multi-period supply chain network with product return will be studied. The operation risks are assumed as failures occurring in supplier and plant segments. The mathematical modeling will select the best suppliers according to selling price, transportation costs and the average of deficiency. Uncertainty is considered by means of fuzzy approach. The proposed multi-objective fuzzy model is first defuzzified using Jimenez technique and then has been solved by TH method. As the supply chain problems are determined as NP-Hard problems, in this study we took advantage of NSGA II in a large-scale case.

Keywords: Closed loop supply chain network design, Environmental optimization, Multi objective fuzzy programming, NSGA II, Operational risks.

Probabilistic Inventory Control Model under Trade Credit Policy

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Inventory control systems are supposed that the purchasing cost is paid at the time of delivery of product. But sometimes in order to motivate the customers to buy more, supplier lets customers to pay the purchasing cost under delay payment method as an incentive policy. In this paper a periodic inventory control model is considered in which the interval between

two replenishments is a random variable. Indeed the economic order quantity model is developed under two policies including delayed payment and stochastic replenishment interval. It is proved that the profit function of retailer is concave and the main aim of this paper is to determine the maximum level of inventory such that the profit of retailer is maximized. In continue in order to show the applicability of the proposed model, several numerical examples and sensitivity analyses have been presented.

Keywords: Delayed payment, Inventory control, Stochastic period length, Trade credit.

Disaster Relief Vehicle Routing with Covering Approach and Fuzzy Demands Using Hybrid Harmony Search Algorithm

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One of the most important activities need to be performed in times of crisis is to optimize the allocation and distribution of resources among individuals. Time is a critical factor effective to increase the number of people rescued by the relief activities. In this paper, we present a relief vehicle routing model in the affected area using covering tour approach to reduce total response time. Also, it is too difficult to determine the real amount of demands for essential commodities, e.g. first-aids, drinking water, etc. Therefore, we consider a fuzzy chance-constrained programming model based on the fuzzy credibility theory. In order to validate the model, several numerical examples are solved by using branch and bound method. Moreover, a Meta-heuristic algorithm based on harmony

search algorithm incorporated with stochastic simulation is developed and proposed to solve the problem. The results of the proposed algorithm compared with the results of the exact method and show 1% error for the algorithm which indicates the efficiency of the proposed algorithm. To evaluate the efficiency of the proposed algorithm on a large scale, the results of the algorithm have been compared with the results of GRASP method. The experimental results have shown that the proposed algorithms show acceptable performance in a reasonable time.

Keywords: Disaster logistic, Covering tour, Credibility theory, Harmony search algorithm, Stochastic simulation.

Developing a Bi-Objective Model of the Closed-Loop Supply Chain Network design compatible with environment

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Closed-loop supply chain network (CLSCN) design aims at incorporating environmental considerations into the traditional supply chain design by including recycling, disassembly and reuse activities. In a CLSCN, the environmental considerations can also be facilitated by resorting to environmentally friendly materials and enhancing product reuse through the design of an appropriate product recovery, disassembly, and refurbishing network. In this design process, tradeoffs must be made to accommodate the profit and greenness maximization objectives. In this paper, a bi-objective binary integer programming model is developed and solved for an integrated forward/reverse logistic network including three echelons in forward direction (namely, suppliers, assembly centers and customer zones) and two echelons in the reverse direction (namely,

disassembly and disposal centers). A set of Pareto optimal solutions is obtained to show the trade-off between the profit and the greenness objectives. Also, some useful managerial insights are developed through various experiments.

Keywords: Bi-objective, Green supplier selection, Network design, Reverse logistics.

Identifying and Prioritizing of Risks in Electric Industry Development Projects (Case study: Transmission and High Distribution of Khorasan Regional Electric Co.)

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Each year, many large scale national projects face to operational problems. In this regard, risk management can play a significant role in identifying and taking preventive activities. In this research, using Project Management Body of Knowledge (PMBOK), a risk management procedure has been designed and implemented in transmission and high distribution power lines of Khorasan Regional Electric Company. First, different kinds of risks in transmission and high distribution power lines have been identified. Next, risks analysis have been carried out based on probability of occurrence, ease of detection, manageability as well as their impact on project goals. The rate of goals achievement was taken into account by three criteria

including time, cost and quality of execution. This was followed by classification of the risks, through risk breakdown structure, and their prioritization. The results have shown that budget shortage, sanctions issues, improper selection of project team, are the main risks in the projects considered in this research. The proposed approach in this study, with minor modifications, may be employed to manage the risks in other large scale national projects.

Keywords: Electricity production industry, Project management body of knowledge, Risk analysis and prioritization, Risk breakdown structure.

A Hybrid Model for Supplier Selection and Order Allocation in Supply Chain

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Performance of a supply chain highly depends on its suppliers and therefore, appropriate selection of them is of great importance. This paper presents an integrated model of an MCDM method and a mathematical programming in order to select suppliers and determine lot sizes in the supply chain. It proposed framework comprises two main sub-models; the qualitative sub-model seeks to evaluate the suppliers by means of Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). Then, in the quantitative sub-model, a mixed integer nonlinear program is proposed in order to determine the optimal orders allocated to each supplier. Fuzzy multi-objective method (TH) is used to tackle complexity of the model. The most notable features of the proposed model is considering different quality levels and related defective rates as well as partial supplier switch. Finally, to demonstrate applicability of the proposed model and superiority of the developed

algorithm, several example problems are generated and have been solved.

Keywords: Fuzzy multi-objective method (TH), Order allocation, Supplier selection, TOPSIS.

New Mathematical Modeling for a Facilities Location and Vehicle Routing Problem Solving by a Hybrid Imperialist Competitive Algorithm

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Increasing of the distribution efficiency is one of the most objectives of an integrated logistic system developed as a new management philosophy in the past few decades. The problem is examined in two parts: facilities location problem (FLP) for long policies and vehicle routing problem (VRP) to meet the customer demand. These two components can be solved separately; however, this solution may not be an optimal solution of the original problem. Hence, in this paper, facilities location and vehicle routing problems are considered simultaneously to visit the facilities that should be serviced. Due to the complexity of the integrated problem in large sizes, a hybrid imperialist competitive algorithm (ICA) is proposed. Furthermore, to show the efficiency of the proposed hybrid ICA, a number of test problems in small and large sizes are solved. Finally, the obtained results are evaluated with the results obtained by CPLEX and in the last the conclusion is provided.

Keywords: Facilities location, Imperialist competitive algorithm, Vehicle routing problem.
