Summaries

Tomasz Ambroziak, Konrad Lewczuk: **Multicriteria Evaluation in Application to Storage Area Configuration** • Automatyka 2009, t. 13, z. 2

Storage area is warehouse main functional area and generates significant part of operational costs or investment expenditures. This costs depend from implemented storing technology and spatial configuration of area. This is why it is important to search for such a storage area layout which will match investment evaluation criteria. Multicriteria method allows for evaluating design alternative of storage area and selecting the rational variant.

Keywords: *storage area, multicriteria evaluation, storage, warehousing, warehouse, storing*

Irena Bach, Robert Wójcik, Grzegorz Bocewicz, Zbigniew Banaszak: **Designing of Dedicated Decision Support Systems Aimed at Discrete Processes Scheduling** • Automatyka 2009, t. 13, z. 2

The way an enterpise's production capacity is used decides about its comeptitiveness. In that context studies aimed at designing of decision support systems (DSS) dedicated to discrete processes scheduling are of primary importance. The metodology of such DSS designing is presented on a projecs planning descission support system example. The concept of a new generation of interactive, game-like organized visual interface is proposed.

Keywords: *decision support system, schedule, discrete process, interface, visualization*

Artur Banul, Konrad Wala: **Comparison of Static Scheduling Algorithms for Selected Multiprocessor Architectures** • Automatyka 2009, t. 13, z. 2

A formal model of static scheduling problem of dependent computational tasks in homogeneous multiprocessor system is presented. The dependent computational tasks are modeled by acyclic weighted task precedence degraph $G = (V, E)$, where V is a task set, E describes the precede relation in set V and functions p: $V \rightarrow R^+$, a: $E \rightarrow R^+$ define the mean task execution and message transmis-

sion time, respectively. We give a description of six constructive scheduling algorithms for schedule calculation before application software execution by means of the algorithms of APN (Arbitrary Processors Network) class. Taking into account a number of important efficiency criterions, we picture the results of computational investigations of performance comparison of the scheduling algorithms for selected multiprocessor architectures. The computational results are discussed at the end of the paper.

Keywords: *static scheduling, homogeneous multiprocessor architecture*

Lev Belava: **Concept of Hybrid Service Composition in SOA Environment** • Automatyka 2009, t. 13, z. 2

The paper describes the concept of hybrid networked services composition. The proposed concept allows to use different techniques to build an abstract composition plan for the whole processes or just process elements.

Keywords: *SOA, Web Services, service composition*

Wojciech Bożejko, Michał Czapiński, Mieczysław Wodecki: **Parallel Hybrid Algorithm for Flow Shop Problem with C_{sum} Criterion** • Automatyka 2009, t. 13, z. 2

In the paper we consider flow shop problem with the criterion of minimalization of the sum of job's finishing times ($F||C_{sum}$). We present the parallel algorithm based on the simulated annealing method. Obtained results are compared to the best known from the literature.

Keywords: *scheduling, flow shop problem, simulated annealing, parallel algorithm*

Wojciech Bożejko, Mariusz Uchroński, Mieczysław Wodecki: **Parallel Meta^{2}heuristics for the Flexible Job Shop Problem** • Automatyka 2009, t. 13, z. 2

We consider a double-level metaheuristic optimization algorithm in this paper. The algorithm proposed here includes two major modules: the machine selection module, which is executed sequentially, and the operation scheduling module executed in parallel.

On each level a metaheuristic algorithm is used, so we call this method meta^{2}heuristics. We carry out computational experiment using 128-processors Graphics Processing Unit (GPU).

Keywords: *job shop problem, parallel algorithm, GPU*

Wojciech Bożejko, Mieczysław Wodecki: **Local Minima Analyzing Method for some Discrete Optimization Problems Solving** • Automatyka 2009, t. 13, z. 2

In this paper we consider two machine flow shop problem with penalties sum minimization criterion where penalties are established for jobs tardiness. We propose an approximate algorithm which the main element is a module of local minima analyzing determining by a fast local search algorithm. We compare the obtained results with the optimal solutions.

Keywords: *scheduling, flow shop problem, two machine, local minima, approximate algorithm*

Krzysztof Bruniecki: **Comparison of Algorithms for Weighted Graph into Graph Embedding Problem with Minimization of Communication Delays** • Automatyka 2009, t. 13, z. 2

This paper discusses different algorithms implemented for graph into graph embedding problem. Due to computational complexity hardness, some of presented algorithms are based on heuristic approach. For limited graphs instances exact algorithms with an idea of backtracking are proposed. Comparison between presented algorithms, in aspects of time and the quality of obtained solutions is presented. Presented algorithms have been implemented in C++.

Keywords: *graph into graph embedding, weighted dilation, backtracking*

Krzysztof Cetnarowicz, Tadeusz Dyduch, Jarosław Koźlak, Małgorzata Żabińska: **Application of Multi-agent Approach in SOA Systems** • Automatyka 2009, t. 13, z. 2

In the paper, an overview of the research domain as well as tools related to development of SOA systems based on automatic composition of Web Services is presented. The concept of applying multi-agent approach in such systems and a project of its architecture are given. The domains of implemented pilot realisations are shown.

Keywords: *SOA, Web Services, Multi-agent systems, service composition*

Jacek Dąbrowski: **Application of Clonal Selection Algorithms to Solving the Vehicle Routing Problem** • Automatyka 2009, t. 13, z. 2

Clonal Selection (CS) algorithms are discrete optimization algorithms that belong to the class of Artificial Immune Systems. In this work we present an application of CS principles to solving the NP-hard Capacitated Vehicle Routing Problem. We present details of the algorithm and some results of computer experiments aimed at assesing the parameters of the algorithm, as well as comparing it with a Simulated Annealing algorithm for CVRP.

Keywords: *clonal selection, vehicle routing, discrete optimization, artificial immune systems*

Bogusław Filipowicz, Wojciech Chmiel, Piotr Kadłuczka: **Guided Search of the Solution Space in Swarm Algorithm** • Automatyka 2009, t. 13, z. 2

This paper investigates a new advanced swarm algorithm for optimization of permutation problems. The introduction in algorithms the expected value of objective function allows effective evaluation of quality of partially fixed solutions. The parameter can be used as auxiliary criterion for selection and construction of new solutions, increasing the effectiveness of designed algorithms. The experiments were performed for standard test problems of quadratic assignment problems (QAP).

Keywords: *swarm algorithm, approximate algorithms, conditional expected value of objective function, quadratic assignment problem*

Mirosław Gajer: **The High Quality Machine Translation System** • Automatyka 2009, t. 13, z. 2

In the paper there is described the way of operation of a fully-automatic machine translation system the purpose of which is to translate the news from the international currency exchange market. The system is based on the method of translation patterns that was proposed by the author. This method of automatic translation allows to transfer the translation process from the level of insulted words into the higher level of phrases thus eliminating the peril of arising some ambiguities that are very difficult to manage with the use of computer. The obtained quality of translation is so high that

they can be publish on Internet pages without any further human expert intervention.

Keywords: *computational linguistics, machine translation, specialised systems*

Adam Głowacz, Grzegorz Dobrowolski: **Software and Integration Work Station for Investigation of Acoustic Signals of Imminent Failure Conditions of Elctrical Machines** • Automatyka 2009, t. 13, z. 2

The purpose of the work is to present software and integration of work station for investigation of acoustic signals of imminent failure conditions in electrical machines. The proposed approach allows you to specify the tasks of the system, followed by the construction of work station. The work station allows you to investigate different algorithms depending on considered electrical machine.

Keywords: *software, integration, work station, acoustic signal, imminent failure condition*

Henryk Górecki: **Analytic Determination of Extrema and Zeroes of *n*-th Order Differential Equations** • Automatyka 2009, t. 13, z. 2

A method for determination the extrema of solutions of linear differential equations with constant coefficients of the third and higher orders.

Keywords: *transcendental equations, zeros, extrema*

Józef Grabowski, Jarosław Pempera: **A Hybrid Tabu Search Algorithm for the Non-Permutation Flow Shop Problem** • Automatyka 2009, t. 13, z. 2

The paper deals with non-permutation flow shop with total completion time criterion. In the paper the mathematical model and graph model is presented. Some properties of the problem associated with the block theory have been presented and discussed. These properties allow us to significantly reduce neighbourhoods which are based on the adjacent interchange type. To validate efficiency of the discussed neighbourhoods, the hybrid tabu search algorithm have been developed and executed on a well-known Tailard's benchmarks.

Keywords: *non-permutation flow shop problem, total completion time, tabu search*

Marek Hryniewicz, Jerzy Niedźwiedzki: **Development of System for the Biomedical Measurements** • Automatyka 2009, t. 13, z. 2

The article includes principles of the cerebral circulation system and the theoretical aspects of the infusion test (IT) method of hydrocephalus diagnostics. Authors presented the intercranial pressure (ICP) monitoring measurement system designed in the Department of Manufacturing Systems of University of Science and Technology AGH. The measurement system was practical verified in the Department of Neurosurgery of the Jagiellonian University in Cracow.

Keywords: *measurement system, cerebral circulation, intercranial pressure, infusion test, hydrocephalus*

Władysław Jodłowski, Edward Michlowicz: **Influence of the Time for Structures of Production Systems** • Automatyka 2009, t. 13, z. 2

Complex production systems are being considered (for example steelworks, of copper). One should design the structure of such a system for the distant range of the time. In the paper changes in initial magnitudes of the system were considered (among others in the size and the structure of the demand for products), in entrance sizes (among others in the availability of raw materials) and other (among others environmental protections). Changes of the structure in the time were illustrated on the example of changes in the structure of the metallurgy of steel.

Keywords: *production system, structure, time*

Waldemar Kaczmarczyk: **Proportional Lots Sizing and Scheduling with Long Processing Times** • Automatyka 2009, t. 13, z. 2

This paper addresses mixed integer programming model of the lot-sizing and scheduling problem for several products on a single machine with constant, limited capacity. Discussed model, called PLSP, allows processing of two products in a single period and explicitly describes the processing times before and after of every changeover. In this paper the PLSP model is adapted to the case of setup times longer than a single period.

Keywords: *production, lots sizing and scheduling, mixed integer programming*

Piotr Kadłuczka, Wojciech Chmiel, Jacek Piwowarczyk: **Knowledge Processing Strategy in the Multi-Population Evolutionary Algorithm** • Automatyka 2009, t. 13, z. 2

The paper presents intelligent agent approach to multi-population evolutionary algorithm with self-adaptation. The algorithm was used to solve traveling salesman problem that belongs to the NP-hard permutational problem class, one of the most popular optimization discrete problem. Concurrent system realization allows to exchange data, like solutions, results and parameter estimations between algorithms. The possibility to improve the algorithm and system efficiency is based on the strategy and knowledge processing diversification.

Keywords: *multi-population evolutionary algorithm, multiagent system, traveling salesman problem*

Mariusz Kaleta: **Subsidy-Free Cost Allocation in LP-Games** • Automatyka 2009, t. 13, z. 2

We consider a game theory model for cost allocation problem with empty core. In that case, a subsidy-free cost allocation involves relaxation the condition for full cost recovery. Such an allocation can be computed by solving multicriteria optimization task MASIT with equitable rational preference relation. As we present in our computational results, the allocations can be efficiently computed by column generation technique.

Keywords: *cost allocation, cooperative games, LP-games*

Mariusz Kaleta, Kamil Smolira, Eugeniusz Toczyłowski: **Optimization of the Market Processes' Structure** • Automatyka 2009, t. 13, z. 2

The proposition of multi-criteria mixed-integer optimization model for various market processes' structure is discussed. First we present general formulation of the model and next we consider the possibilities of convenient model adaptation to the specific market systems. We also analyze the possibilities of modelling market developer's preferences using the reference point method. All detailed issues are presented using a power market example.

Keywords: *scheduling, market processes, power market*

Piotr Kisiel, Paweł Gara: **Implementation of Integrated Production Control Systems in Small and Medium-Size Companies – the Assessment** • Automatyka 2009, t. 13, z. 2

Sector of small and medium-size companies is characterized with extreme development dynamics. In Polish conditions these are mainly family companies of minor capital. Commonly known and applied methods of the production control have been presented in this study. Analysis of implementation of such companies into small and medium-size company sector was also made.

Keywords: *production control systems, small and medium-size companies*

Piotr Kisiel, Paweł Gara: **Warehouse Areas in Poland** • Automatyka 2009, t. 13, z. 2

Warehouse services market in Poland has been presented in this study. On the background of neighboring countries, development perspectives of the warehouse market in Poland were presented, including differences between warehouse and logistic services. Criterions, which should be followed by logistic centers and barriers of their development in Poland were also presented.

Keywords: *warehouses, logistic service centers*

Marcin Klimek, Piotr Łebkowski: **Algorithms of Robust Resource Allocation for Resource-Constrained Project Scheduling Problem** • Automatyka 2009, t. 13, z. 2

In article are presented algorithms of robust resource allocation for resource-constrained project scheduling problem. Effectiveness of algorithms have been tested on the *J*90 instance set of *PSPLIB*. As the evaluation criterion proposed by authors measures of robustness of resource allocations were applied.

Keywords: *robust scheduling, resource allocation, resource-constrained project scheduling*

Jarosław Koźlak, Małgorzata Żabińska: **Solving Transportation Problems Using Agents** • Automatyka 2009, t. 13, z. 2

In the paper, the system based on the concept of holons, which solves transportation problems has been presented. The proposed

system has enabled to compare the quality of solutions offered by classic algorithms for widely known and applied test problems. These problems have been modified to take into consideration potential crisis situations as well as possibilities given by the use of holonic approach.

Keywords: *transportation problems, multi-agemy systems, PDPTW, holons*

Jolanta Krystek, Marek Kozik: **Analysis of the Job Shop System with Transport and Setup Times** • Automatyka 2009, t. 13, z. 2

In the paper a job shop problem with transport and setup times is described. The application with implemented dispatch rules (FIFO, LIFO, LPT, SPT, EDD, LWR) for solving this problem has been created. It uses different criteria of estimation of schedules quality. Numerical results of comparative study of algorithms for a variety of criteria and dispatch rules are presented.

Keywords: *job shop, production schedule, transport, setup time, dispatch rules*

Joanna Kwiecień: **Use of Queueing Networks to Modeling of Health-Care Structures** • Automatyka 2009, t. 13, z. 2

Queueing networks are a good tool for determining the performance and operating measures of real systems. This article presents the use of priority queueing networks and queueing networks with blocking to modeling of selected health-care structures. Performance measures of queueing systems have been also presented.

Keywords: *priority queueing networks, queueing networks with blocking, queueing models of health-care*

Antoni Ligęza: **AND-OR Graph with Knowledge Propagation Rules as a Model for Constraint Satisfaction Problems** • Automatyka 2009, t. 13, z. 2

In this paper a model for Constraint Satisfaction Problems based on the concept of AND-OR graph is presented. The graph provides a structure to model search-space for alternative solutions. In order to represent auxiliary constraints it is completed with a set of rules for knowledge propagation. The rules can be used for efficient modelling of constraints for knowledge propagation and for detec-

tion of inconsistency. An example from the area of automated diagnosis is used to illustrate the application.

Keywords: *Constraint Satisfaction Problems, AND-OR graphs, rules*

Antoni Ligęza, Sebastian Ernst, Grzegorz J. Nalepa, Marcin Szpyrka: **A Conceptual Model for Web Knowledge Acquisition System with GIS Component** • Automatyka 2009, t. 13, z. 2

Building efficient tools for supporting Knowledge Acquisition and Knowledge Management is a challenge and hot research topic with potentially infinite numbers of applications. In modern computer science, the web technologies open a completely new chances for massive, distributed knowledge acquisition. Examples of such social phenomena as Wikipedia constitute a working proof of high potentials incorporated in the synergy of human and web interaction.This paper discusses certain issues concerning the conceptual model for a distributed knowledge acquisition system gathering and organizing knowledge on threats of various nature and aimed at improving safety of citizens in urban environments. The system for registering citizen-provided information is a part of the INDECT FP7 Project. Contemporary tools and techniques to be applied, including GIS technologies and Semantic Wikis are presented in brief and future problems to be solved are identified.

Keywords: *distributed web knowledge acquisition, GIS, knowledge management, semantic wikis*

Marek Magiera: **Module System of Supply Chain Management** • Automatyka 2009, t. 13, z. 2

The paper presents the three–level method of supporting supply chain management. The initial schedule for each manufacturer is created at the first level. The second level is used for scheduling of transport products between manufactures. The final schedule for each manufacturer is created at the third level. The linear mathematical models of mixed integer programming are used in the method. The global optimization (minimization of costs) and local optimization (for each manufacture) are simultaneously regarded in the described method.

Keywords: *supply chain, production planning, integer programming, flexible manufacturing systems, scheduling*

Mariusz Makuchowski, Adam Tyński: **Self-Control Mutation in Genetic Algorithms** • Automatyka 2009, t. 13, z. 2

In this paper a general method for determining a probability of mutation in evolutionary algorithms is given. The presented method if illustrated by a genetic algorithm for no wait job shop problem. We compare experimentally a classical evolutionary algorithm with parameters determined in a standard way with an evolutionary algorithm equipped with the proposed method.

Keywords: *self-control mutation, genetic algorithm, no wait job shop problem*

Edward Michlowicz: **The Logistics but the Systems Theory** • Automatyka 2009, t. 13, z. 2

The development observed for years of the logistics aims at building the theory of the logistics. For her a scientific nature is being discussed. For many authors there is no doubt that the theory of the logistics should be settled in the systems theory. Against this background however many expressions of both expressions running away from recognized and universally accepted dates and the definition appear. Tidying up and systematizing connections of the logistics and systems is planning the author. A conception is an effect recapitulating discussions of logistic system.

Keywords: *logistics, systems theory, logistic system*

Jerzy Mikulik, Mirosław Zajdel: **Methodology of Hospital Security Assessment Using Logical Trees** • Automatyka 2009, t. 13, z. 2

Nowadays, in dangerous reality, when various attacks' threats aimed at peacefully minded people are growing and to it more and more new illnesses and even epidemics are appearing rapidly and with greater strength than before, there is a pretty greater need for high security maintenance inside buildings, especially inside buildings of health service. This paper describes a method of |hospital security assessment using sanitary zones division and logical trees and also presents innovative matrix model dedicated to this end.

Keywords: *hospital, security assessment, intelligent building*

Wojciech Mitkowski, Krzysztof Oprzędkiewicz: **Stabilization of an Uncertain-Parameter, Undamped Oscillatory Plant with the Use of Delayed Feedback** • Automatyka 2009, t. 13, z. 2

In the paper a problem of stabilization for an uncertain-parameter, undamped, oscillatory control plant with the use of feedback with delay is presented. It is known, that the feedback with delay is able to stabilize the plant we are concerned with. In the paper it was shown, that the increasing of the plant uncertainty can decrease areas of a robust stability at the plant of controller parameters: the delay time and the proportional gain.

Keywords: *uncertain-parameter oscillatory plant, feedback with delay*

Grzegorz J. Nalepa: **Analysis of Selected Knowledge Representation Methods in Semantic Wikis** • Automatyka 2009, t. 13, z. 2

Wiki systems are a popular class of web application, providing distributed content authoring with simplified markup and full versioning. Semantic wikis are an important extension of classic wikis. They introduce metadata annotations allowing for semantics representation. Moreover, problem solving knowledge in the form of queries can be introduced, thus allowing for advanced search capabilities. The paper introduces a comprehensive overview of knowledge representation solutions found in the current implementation of the wiki. In the paper a discussion of knowledge quality assurance in such systems, e.g. basic criteria for knowledge evaluation in semantic wikis is also given. The technology is analyzed in the context of the EU FP7 INDECT Project, where a collaborative web environment is to be built.

Keywords: *Semantic Web, wikis, semantic wikis, knowledge representation, knowledge quality*

Grzegorz J. Nalepa, Weronika T. Furmańska: **Review of Semantic Web Technologies for GIS** • Automatyka 2009, t. 13, z. 2

Geographic Information Systems (GIS) play a growing role in number of computer applications. They allow to store, represent and search geographic information. They provide an effective foundation for digital maps, planning applications and localization services. GIS integrate number of technologies, including efficient storage solutions, relational databases that allow for searching the

data, and advanced visualization components. An important improvement in the development of these systems was the introduction of Web-based GIS (or WebGIS). A flexible Web-based interface allows for an easy access for number of clients providing a simple web browser. The next step in the evolution of GIS is the integration of semantic technologies developed within the W3C Semantic Web initiative. Technologies such as metadata descriptions with RDF, and formal ontologies in RDFS and OWL allow for enhanced search and classification in GIS. The focus of the paper is on technologies suitable for representing GIS metadata for the need of the system being designed within the FP7 INDECT project.

Keywords: *GIS, Semantic Web, knowledge representation*

Edward Nawarecki, Jarosław Koźlak: **Agent Model of Logistic System** • Automatyka 2009, t. 13, z. 2

In the paper a concept of methodology fot development of Multi-agent systems for modelling and optimising supply chains is presented. The ex ample of a pilot realisation of the system and examples of experimental results are shown.

Keywords: *modeling and optimization of supply chains, multi-agent systems*

Edward Nawarecki, Leszek Siwik: **Evolutionary-Multiagent Platform for Multiobjective Optimization** • Automatyka 2009, t. 13, z. 2

Against the general idea of realization of virtual agent systems, condensed description of intelligent computational platform dedicated for solving complex multiobjective optimization problems is presented. As an illustration a selected results of experiments are also presented.

Keywords: *multi-agent systems, multiobjective optimization, computational platform*

Paweł Obszarski, Marek Kubale: **Scheduling Multiprocessor Tasks with Hyperedge Coloring Model** • Automatyka 2009, t. 13, z. 2

In this article we consider the problem of scheduling unit processing time multiprocessor tasks on dedicated processors with re-

petition and availability constraints. W present collected results of complexity of this problem for different types of instances and scheduling criteria. To describe the problem we use the model of edge coloring of hypergraphs.

Keywords: *multiprocessor tasks, dedicated machines, hypergraph edge coloring*

Krzysztof M. Ocetkiewicz: **Branch-and-Bound Algorithm for a Certain Time-Dependent Scheduling Problem** • Automatyka 2009, t. 13, z. 2

The article presents a branch-and-bound algorithm for a following time-dependent scheduling problem: $1 \mid p_i = 1 + a_i s_i \mid \Sigma C_i$. The computational experiments were conducted to examine the efficiency of the algorithm. Application of the presented algorithm allows us to increase the size of input instances that can be solved to optimality in reasonable time by 6–10 jobs, compared to the exhaustive-search algorithm.

Keywords: *time-dependent scheduling; branch-and-bound*

Krzysztof Oprzędkiewicz: **PLC Implementation of Control Strategies for Uncertain-Parameter Plants** • Automatyka 2009, t. 13, z. 2

In the paper problems of PLC implementation of special control strategies are presented. As an example the robust, discrete, finite dimensional dynamic compensator for an interval parabolic system implemented at the SIEMENS SIMATIC S7 300 PLC was considered.

Keywords: *uncertain-parameter systems, PLC, digital control*

Piotr Pałka, Eugeniusz Toczyłowski: **Pricing Mechanisms by the Generalized Yoon's and Parametric Methods** • Automatyka 2009, t. 13, z. 2

In the paper we compare two pricing rules designed for stock exchanges and auction markets. We analyze the Modified Vickrey Double Auction known from the literature, and the parametric pricing rule, developed by us for the exchanges. We compare proper-

ties of these rules on the basis of illustrative examples. We also propose an algorithm which reduces the budget unbalance.

Keywords: *pricing rule, market design, mechanism theory*

Tomasz Pełech-Pilichowski, Jan T. Duda: **An Application of Immune Approach to Time Series Forecasting** • Automatyka 2009, t. 13, z. 2

This article presents an idea of application of immune paradigm to symptomatic event detection, announcing long-term trend changes in time series that give a possibility to improve efficiency of short and medium-term prediction based on linear trend extrapolation. A conception of immune-like algorithm and definition of main system objects are presented, exemplary results of calculation (applied to financial time series) given with partially implementation of proposed immune-based algorithm are showed.

Keywords: *event detection, prediction, artificial immune systems, data mining, time series*

Bartosz Sawik: **A Weighted-Sum Mixed Integer Program for Bi--Objective Dynamic Portfolio Optimization** • Automatyka 2009, t. 13, z. 2

The portfolio selection problem presented in this paper is formulated as a bi-objective mixed integer program. The portfolio selection problem considered is based on a dynamic model of investment, in which the investor buys and sells securities in successive investment periods. The problem objective is to dynamically allocate the wealth on different securities to optimize the weighted difference of the portfolio expected return and the probability that the return is not less than a required level. In computational experiments the dataset of daily quotations from the Warsaw Stock Exchange were used.

Keywords: *bi-objective dynamic portfolio optimization, mixed integer programming, value-at-risk*

Tadeusz Sawik: **A Bi-Objective Mixed Integer Program for Supplier Selection** • Automatyka 2009, t. 13, z. 2

The problem of allocation of orders for custom parts among suppliers in make to order manufacturing is formulated as a bi-ob-

jective mixed integer program. Given a set of customer orders for products, the decision maker needs to decide from which supplier to purchase custom parts required for each customer order. The selection of suppliers is based on price and quality of purchased parts and reliability of on time delivery. Numerical examples are presented and some computational results are reported.

Keywords: *supplier selection, multi-criteria decision making, mixed integer programming*

Piotr Sienkiewicz: **Systems Analysis of Threats and Cyberspace Security** • Automatyka 2009, t. 13, z. 2

The general model of European cybernetic space (EPC) was introduced by users. The model was shaped by of supplies of infrastructure UE. Both individual, and the institutional users of the EPC are risked on informative threats, among which the most dangerous become the threat the cyberterroristic. In the analyses the level of development of European informative society were introduced and the initiative of UE in range of growth of safety the EPC as well. The basic scripts were presented for security the possible the and probable cybernetic threats of the EPC and as the conditions of safe European informative society as well.

Keywords: *cyberspace, information threats, information politics, information security*

Piotr Sienkiewicz: **Value Information in the Management Organization System** • Automatyka 2009, t. 13, z. 2

The article presents chosen models of evaluation information, concentrating the attention on method of analysis and evaluation of management expressing in system the informative needs of decision organs opinion.

Keywords: *information, quality, utility, value information, model*

Magdalena Szymczyk, Piotr Szymczyk: **Software Techniques for Reliable Computer Control Systems** • Automatyka 2009, t. 13, z. 2

Computer systems have existed for over 50 years and surround us so much. They are invisible but problem of their reliability is

now very actual. Computers hardware, software becomes so complicated that possibility of its improper operation is much bigger. This article presents available software technologies for more reliable computer control systems with their analysis and comparison.

Keywords: *reliability, fault-tolerance, redundancy*

Piotr Szymczyk, Magdalena Szymczyk: **Methods of Process Scheduling in Real Time Systems** • Automatyka 2009, t. 13, z. 2

Scheduling in RTOS have direct influence on performance of whole system, so selection of the right algorithm is very important part of the configuration. The number of scheduling methods exists. This paper is a survey of scheduling algorithms for real time operating systems.

Keywords: *real time operating systems, scheduling*

Andrzej Świątoniowski, Ryszard Gregorczyk: **Analysis of Information Transfer System Quality Using Six Sigma Methodology** • Automatyka 2009, t. 13, z. 2

Information transfer system today have greater and greater weigh for firm, particularly when its global range activity has to be taken into consideration. Putting information transfer as a specific kind of manufacturing process, Six Sigma methodology has been used for its quality valuation. The obtaining results of investigations fully confirm, that also in such a process the above mentioned methodology make it possible to significant improve quality.

Keywords: *quality, information transfer system, Six Sigma*

Andrzej Świątoniowski, Ryszard Gregorczyk, Stanisław Rabiasz: **Quality System Related to Light Truck Production** • Automatyka 2009, t. 13, z. 2

Activities on the field to ensure a good quality of the delivery truck assembly may be considered as a time variable process which is a subject of general control principle. On the other side taking into account machine and workers team contribution to a common enterprise seems to be necessary. In this paper questions resulted

from this conditions has been discussed based on the screw joint assembly when using torque screwdrivers and wrenches.

Keywords: *screw joint, assembly, quality system*

Tomasz Tuński: **Development of the Marine Saturated Steam Production Systems Determined by Steaming Capacity Increase** • Automatyka 2009, t. 13, z. 2

The single stage, single pressure systems saturated steam production, which is the primary heat transfer medium are the most frequently built steam systems on the merchant marine ships. Their progressive development allowed to constant increase of the overall steam production. In the future the trend of these systems development should be based on feed water temperature increasing by means of utilization of waste heat which is available in ships engine room.

Keywords: *steam production systems, saturated steam, waste heat recovery*

Adam Tyński, Mariusz Makuchowski: **Modelling and a Solution Algorithm for the Flowshop Problem with Transportation** • Automatyka 2009, t. 13, z. 2

In the paper the flexible manufacturing system with the flowshop structure is considered in which machines are arranged into the single loop layout. In the system all transports between the machines are performed by the set of identical AGV vehicles. For the system the mathematical representations and the heuristic solution method utilizing tabu search scheme have been presented. The algorithm has been tested numerically to determine the quality of the generated solutions in the relation to the number of AGV vehicles utilized.

Keywords: *permutation flowshop problem, transportation, AGV, tabu search*

Grzegorz Wąchocki: **Supporting Medical Rescue by SOA Paradigm Based System** • Automatyka 2009, t. 13, z. 2

Coordination of medical rescuing operation is a very complex task. It is not supported by any computer system available on the market. However, it seems that such a problem may be solved using SOA paradigm. The proposal is to represent medical services by

Web Services, which are available publicly in the Internet, and to create a system capable of searching for medical services and, by means of a process modelling language, compose a rescue operation process based on these services.

Keywords: *SOA, medical rescue support, dynamic service composition, dynamic/phased business process composition, embedding business processes, web services, BPEL*

Łukasz Wrona: **Security Guaranteeing in Systems with Backup Links** • Automatyka 2009, t. 13, z. 2

We are considering security guaranteeing in systems with tree topology, augmented by additional backup links. A group of mobile autonomous agents needs to capture an invader, regardless of his strategy. In literature this problem is modeled as graph searching. We narrow the currently known search number estimation for cacti of degree 3 to two possible values for each number of branches with search number less than, or equal to k. We also classify type (**) branches, which have a hub or an avenue.

Keywords: *graph searching, computational complexity, search number, system security, cacti*

Anna Zygmunt, Jarosław Koźlak, Łukasz Krupczak, Bartosz Małocha: **Weblog Analysis Using Social Network Methods** • Automatyka 2009, t. 13, z. 2

In the paper the application of Social Network Analysis methods to Weblogs was described. The proposed solutions were explained using political blogs as an example.

Keywords: *social networks, measures of social network, Weblogs*