



ECONOMIC SECURITY

DETERMINANTS OF ECONOMIC SECURITY SYSTEM OF THE ENTERPRISE

page 4–7

System building is one of the unsolved finally problem in subject field of economical securitology. The de-universalization of economic security system of the enterprise should be considered. Domestic enterprises are very different, and that is why economic security system of the enterprise cannot be universal.

Economic security system of the enterprise by essence and structure is defined by couple of determinants that cause its scale, complexity, structure and regime of functioning. Such determinants are considered as factors and stable characteristics of internal and external environment of enterprise activity. It is shown in the article how chosen determinants define scale, structure, complexity and regime of functioning for economic security system of the enterprise.

There are some problems defined in research of determination of economic security system of the enterprise. Such problems should be solved. These problems are overcoming the perceptuality of identification of described dominants by their quantification, analyzing the joint impact of determinants and generalizing such impact on state and characteristics of functioning of economic security system of the enterprise.

Keywords: enterprise, economic security, system, determinant, scale, complexity, structure, regimes of functioning.

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DEVELOPMENT OF PRODUCTIVE FORCES AND REGIONAL ECONOMY

STATE ASSISTANCE FOR UKRAINIAN REGIONAL ECONOMY THROUGH SMALL SCALE AGRICULTURAL PRODUCERS DEVELOPMENT

page 8–10

The current trends in national policies for the revitalization of the productive forces, and are some of the results of our research in this area are discussed in this article. The main purpose of the survey is an analysis of legislative proposals for increasing the competitiveness of national agriculture and its products. This article describes the current trends of the national policy on regional economic development, the draft of the Strategy for agriculture and rural areas developing in the 2015–2020, the main strategic priorities for the improvement of rural development, education and advisory services as a tool to achieve their goals. Approaches for improvement the conditions of financial resources concentration in the budgets of local communities and ensure their stable recruitment are analyzed.

We propose to use the analysis of statistical data, international and national research for the adaptation of modern legislative initiatives to the international requirements and the realities of today. The survey's results can be applied to the analysis of government initiatives to strengthen rural development and filling of the budget in order to create productive forces within the framework of regional policy.

Keywords: productive forces, agrarian economy, regional policy.

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MATHEMATICAL METHODS, MODELS AND INFORMATION TECHNOLOGIES IN ECONOMICS

CLASSIFICATION OF COLLECTIBLES AT ONLINE AUCTIONS IN UKRAINE AND POLAND: COMPARATIVE ANALYSIS

page 11–14

New perspectives to expand the range of activities and the customer base are opened to the businessmen with the spread of the Internet. Lack of time and resources were the main criteria to find new trading platforms by the customers. So online trading, including trading in Online Auctions, gaining more and more popularity in the modern world.

The aim of the research is to highlight existing classifications of collectibles at Internet auctions of Ukraine and Poland, followed by analysis of their strengths and weaknesses, as well as the development of theoretical and methodological recommendations for their improvement.

It is formed a common approach to determining the content and structure of the article on the basis of system analysis. Some results are given through methods of analysis and synthesis, induction and deduction, grouping and abstraction.

The differences and similarities between classifications of the same categories of collectibles at the Ukrainian and Polish auctions are highlighted during the research. Ways of improving the existing shortcomings are proposed taking into account the specific categories of collectibles, such as: coins, bonistics, second-hand booksellers, philately and militaria.

Keywords: Internet auction, classification, collectibles, bukinystyka, bonistics, numismatics, philately, militaria.

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ECONOMICS AND MANAGEMENT OF ENTERPRISE

THE IMBALANCE OF SUPPLY AND DEMAND AS AN INTEGRAL INDICATOR, CHARACTERIZING THE OBJECTIVE NATURE OF THE PHENOMENON OF COMPETITION

page 15–27

This article shows the imperfection of the classical theory of competition and the real possibility of their improvement. The aim of this work is to develop a conceptual model of the materialist nature of the competition for use as a working tool in economic science and practice. Non-trivial task was solved by a new, little-known methodological tool – functional-target approach. As a result of this work, which continues a number of other publications of the author, it is developed the new concept of the essence of competition based on balance between demand and supply. It is shown the inefficiency of the classic classification of markets and the competitive relationship (in the range from monopoly to perfect competition), which is based on counting the number of market participants. The possibility of quantitative measurements of competition is shown. It is confirmed that competition is harmful phenomenon. It is confirmed the

effectiveness of the new methodological tool – functional-target approach and accumulated experience of its application. The results can be used: in the design of economic systems of different levels and purposes, with the operational management of micro and macroeconomics, in predicting and planning of economic activity, as well as to optimize the use of available resources and the improvement of economic theory. The proposed interpretation of the theoretical foundations of competition provides a more objective understanding of the materialistic nature of the competition, as harmful phenomenon. It provides an alternative to inefficient classification of the types of competitive relations, based on counting the number of market participants, and improves the efficiency of use of available resources.

Keywords: functional-target approach, economy, competi- tion, balance between supply and demand, «the Golden rule of competition».

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INFORMATION TECHNOLOGY AND CONTROL SYSTEMS

MUTUAL INFLUENCE OF DECISION MAKING INFORMATION MODEL ELEMENTS ESTIMATION

page 28–30

Practical questions of decision making informational model elements mutual influence are presented in this article. For solving science-technical objective of research structural analysis methodology of the model was used. As well, nonparametric and parametric methods of math statistics were used for solving science task of research.

Result of structural analysis of the decision making process informational model are presented by correlation coefficients, that allow to fulfill quantity estimation of the models element mutual influence.

Result of research could be used in frame of information technology and classification systems developing, for analyzing and estimation of professional activity and as a basic factors of working rules in case of creating knowledge base system. The results of models element mutual influence don't conflict with descriptive decision making theory, and on the contrary supplement used hypothesis about existing relation and their direction, given their quantity estimation.

Keywords: decision making process model, structural analysis, information technology, estimation of professional activity.

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INFORMATION SECURITY FACTORS SYSTEMATIZATION

page 30–35

In this article the necessity of solving the theoretical and practical task, aimed on development the methodological basis for elaboration and implementation of information security management system, has been considered. Based on research results of scientific works and the requirements in the field of information security management the universal multilevel system of information security factors of organizations (enterprises) in the wood properties form was offered by using quality control theory and causal analysis. This system allows: to arrange factors in homogeneous characteristics; to demarcate the threats of the organization in the information security field by external and internal context; to determine the nature of the threats; to ensure the development of methodological fundamentals of creation and implementation the information security management system based on the integrated management system. The proposed system can be used as a tool for evaluation and/or reduction of information risks in organizations of various types, kinds and governance forms.

Keywords: information security, system of factors, external and internal context, risk.

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DETECTION OF COMPUTER ATTACKS USING NETWORK ENTITIES MONITORING

page 36–38

This article discusses detection of computer attacks by analyzing behavior of the network elements. The aim of this study is to identify attacks using behavior of the network elements and their connections. Detection of computer attacks is the object of the work

Modern means of intrusion detection allows us to collect and analyze information from computer networks. In this paper, we propose a model of attacks in the form of transitions of network elements. Transitions can be switched from safe to dangerous mode. Transitions used to filter actions of the system.

The results presented in this work show that method is correct. Changes to the formula of attacks improved performance. A model of intrusion detection based on the information about the behavior of network entities can be used in real network.

The research results can be applied to protect information by experts in high-speed systems.

Achieved one of the main purposes of this work, which was to create a method of intrusion detection based on the analysis of the behavior of network entities. This method detects more dangerous transit ions than the works previously proposed.

Keywords: attack, computer network, network objects, intrusion, informational system, the state of the object.

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IMAGE REPRODUCTION QUALITY ESTIMATION FOR OUTPUT RASTER SCANNING DEVICES

page 39–42

Any image conversion leads to its distortion. Therefore, any playback system, providing minimal distortion should give each link in image conversion required quality. This raises the question: what should be the image represented to person, so that it estimated it as high quality?

In television, which is one way of transforming raster scanned images, integral quality criterion includes a set of parameters that characterize chromaticity, size, brightness, contrast, sharpness, uniformity and cleanliness of background and others. Each of these parameters are linked with sensory function of the visual system.

Perception of lineart information, particularly, a font picture depends on the complexity of the characters, brightness, contrast and sharpness of images, and the number of obstacles on the print of the laser printer.

Optimal conditions of perception font alphanumeric characters in a live (dark characters on a light background) and inverse (otherwise) corresponds to different contrast relative thickness of strokes. Therefore fontware symbolic image must form more thin strokes. To transfer a single signal with steep transition from dark to light, as in periodic with a period $\lambda = 2 \times b$, twice bandwidth is required.

If a person as information consumer can work with it indefinitely long, being able to get a grasp text as necessary to return to reading, in most cases sufficient is value $v_R \leq 1/b$. In systems designed to work with operational rapidly changing information in terms of the time limit for its review and evaluation the value $v_R \leq 3/(2 \times b)$ should be used advisable.

Keywords: image, raster output scanning devices, spatial frequency, index of quality, signal.

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MONITORING OF UNAUTHORIZED PLACES OF WASTE ACCUMULATION USING SATELLITE IMAGERY

page 42–45

This paper discusses the monitoring of unauthorized places of waste accumulation as sources of environmental hazards. The main purpose of the study is to analyze the possibility of using widely available remote sensing data and GIS technologies for the rapid detection of these places, the analysis of their development and the construction of rational forms of environmental safety management. The article discussed the currently existing methods of decryption of satellite images and their use by others to solve similar environmental problems. Universal classification image does not reveal places of waste accumulation and to determine the degree of danger to the required accuracy. To select the area of waste accumulation in the image and determine its area requires the introduction of additional parameters. The research results show that the problem with the lack of methods for identifying elements that are the sources of formation of ecological danger still exist with the presence of methods and models for detecting waste dumps and tracking the dynamics of its distribution.

Keywords: ecological safety, waste dumps, detection, satellite images.

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DEVELOPMENT OF ADAPTIVE CONTROL SYSTEM OF MODEL OF THE ROBOT-LOADER ON THE BASIS OF LEGO MINDSTORMS NXT

page 45–48

This article discusses the creation of an adaptive control system of model of the robot loader based on Lego Mindstorms NXT. The task of the robot loader: form a kit of parts based on certain criteria (color, shape, size) and deliver it to the specified point. Objects (details) spread in the subject area in a random order. Objects that do not meet certain criteria are considered to be an obstacle. The robot loader control system during simulation provides: collecting sets of parts based on certain criteria; path synthesis that avoid collisions with obstacles; movement of sets from the starting point to the finish point.

The functional diagram and algorithm of adaptive control system of model of the robot loader based on Lego Mindstorms NXT are developed. The speed and performance for the three ways to control the robot model are analyzed. It is recommended to ensure the performance transfer some control tasks from computer on the embedded processor of the robot.

Keywords: adaptability, control system, simulation, robot loader.

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ADAPTIVE HARDWARE INTEGRATION

page 49–52

The paper is about integration of hardware, developed with adaptive approach (so called «adaptive hardware»), in computing systems. The main goal of the article is to describe the method of adaptive hardware integration in conventional computing systems on hardware level as well as on software level.

Interfacing adaptive hardware and conventional computing system are made with well-known memory mapping method, when the piece of hardware on a bus is represented as a set of registers in the dedicated memory region.

As the result, the tools for automated creation of the bus peripheral device where designed, so any piece of adaptive hardware may be interfaced to the bus, for example, the AXI bus. A technique for adaptive hardware device driver development was described. These achievements have made the use of adaptive hardware much simpler for real-world applications.

Keywords: adaptive hardware, computing systems, operating system integration, computations acceleration.

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IMPROVING THE RELIABILITY OF THE PROCESS OF MATRIX CRYPTOGRAPHIC TRANSFORMATION

page 52–54

The high-speed cryptographic techniques that allow solving the most important problems and securing automated processing of data in real time have a great interest nowadays. High importance and lack of practical solving the problems of improving

performance of cryptographic transformation of the information determining the obvious importance of this study and review the issues related to this subject has both theoretical and practical significance in modern conditions.

Considering that high-speed cryptographic data conversion is the most effective way to ensure these characteristics of safety of information resources as confidentiality and integrity, then surely a promising area of research is to develop methods to increase productivity of the cryptographic systems. Specifically, this study is based on improving the reliability of the cryptographic transformation results in the systems of cryptographic protection of the information.

This article was formed two approaches to improve the reliability of cryptographic transformation process. The first approach allows controlling the synthesis of matrix inverse transformation of information. The second approach allows monitoring the whole process of passing the inverse transformation of information, namely the inverse of the matrix and the results of decoding.

Keywords: cryptographic transformation, information security, privacy, information integrity, encoding, information encryption.

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USE OF THE SOFTWARE STRUCTURE FOR MODEL SYNTHESIS OF POSITIONAL REDUNDANT NUMBER SYSTEMS

page 55–57

The article deals with two areas for further research. The first is to increase the speed of arithmetic units by introducing redundancy, and the second — to improve the reliability of computer technology through the introduction of redundancy by reducing their complexity. The aim is to introduce redundancy based on a study of binary-ternary and binary-senary positional number systems.

As a result of the effect of the expression of information redundancy in the hardware is made calculation of weight coefficients of positional number systems, and deduced a mathematical model of the error checking device. The rules of the operation of addition are formulated, which made it possible to analyze the binary-ternary and binary-senary positional numeral systems for improving the speed of operation of the adder and increase hardware redundancy. According to the expression it is estimated amount of the proposed model variants of positional number systems — the forms of information required for further computational experiment.

Software modules necessary for the models of positional number systems are defined. A number of requirements to the input information redundancy are defined on their basis.

Therefore, introduced information redundancy can reduce the complexity of implementing an adder, while ensuring the required performance.

Keywords: performance, reliability, positional number system, software modules, information redundancy.

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THE REVIEW OF MODERN ONTOLOGY DRIVEN INFORMATION SYSTEMS AND SERVICES, PROSPECT OF THEIR APPLICATION IN E-LEARNING

page 58–60

It is done a comparative overview of current ontology driven information systems that are used or could be used for e-learning systems, and discussed current approaches to e-learning in higher education. The main purpose of the study is to analyze the functionality of the systems «Cyc», «Ontolingua», «The World Fact-Book» and their possible interactions for intercomputer knowledge sharing. Ontology driven information systems are closely related to the conceptualization of the ontological categories and improvement of hierarchic entities at all levels. Ontological principles serve as a unifying mechanism between scientific knowledge of a particular domain and general knowledge focused on solving one of the major problems of artificial intelligence – analysis, synthesis and understanding natural language by computer. The use of ontologies in education is a promising area of research. With knowledge engineering can perform the following tasks: automatic generation of educational-methodical documentation based on ontology of the disciplines; building multidisciplinary ontology with automatic generation of educational content; determining the validity of the information found in the Internet by students; improving the quality of assessment by using the tools of construction of tests and automatic analysis of the responses. An important direction in the development of e-learning is the formalization and automation of the process of building ontology by creating algebra of the ontologies.

Keywords: knowledge, ontologies, knowledge engineering, e-learning.

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DEVELOPMENT OF NEURAL NETWORK METHOD FOR PREDICTION OF METHANE CONTENT IN MINE WORKINGS

page 60–62

Despite the intensive development of computer systems being introduced at the coal enterprises to provide air and gas monitoring, security is still not high enough, so that emergencies continue to occur due to a high concentration of explosive gases. Therefore, development of methods of forecasting the content of combustible gases in mines, which are used to improve the quality of air and gas assessment of the situation is urgent.

In order to solve the problem of forecasting in the article the most common methods of forecasting – extrapolation, mathematical, associative, were analyzed.

On the basis of the comparative characteristics the choice was made in favor of the neural network method. The main criteria for the choice of a particular neural network were such as the presence of feedback, the delay in the input layer, fast learning and prediction accuracy. Amongst all the networks that meet the criteria, the most suitable one is distributed TLFN.

In order to determine the selected network architecture some numerical experiments were carried out. The criterion for the selection of architecture was the minimum MSE. According to the results, network architecture with the number of neurons to 10 of the study was chosen.

In order to evaluate the effectiveness of the proposed method numerical studies that prove the effectiveness of the selected network architecture and its learning algorithm were carried out.

Keywords: prediction, neural network, distributed TLFN, identification of the structure and parameters of the network, mean square error.

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INFORMATION SUPPORT OF ESTIMATION OF RELIABILITY OF THE OPERATOR'S WORK IN CONDITIONS OF INCREASED SITUATIONAL VOLTAGE

page 62–65

In this paper the suggestion to apply the methods of reliability theory to assess the reliability of operation in a high intensity military situational specialist operators was made. As a model the model of chain with a weak link was selected. Arguments that the weak link in this model is a functional system of breathing are presented. For studying and evaluating the reliability of the respiratory system, the mathematical model of the respiratory system with optimal control, which involves automatic resolution of conflicts arising under certain conditions between the metabolic needs of the respiratory and cardiac muscles involved in ensuring the process of mass transfer of gases and tissues work of providing short-term and medium-term adaptation of the respiratory system to internal and external perturbations was used. Description of the iterative procedure of applying the mathematical and software is provided. It is shown that the functional reliability of the respiratory system as one of those that regulate the body's ability to work as a whole, provided mechanisms for sustainability and adaptation to the changing conditions of life.

Keywords: reliability of the operator's work, conditions of increased situational voltage, functional system of breathing.

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DEVELOPMENT OF COMPLEX DATA PROTECTION OF SERVER ROOMS FROM UNAUTHORIZED ACCESS

page 66–68

The problem of providing of information security at the all levels can be solved effectively only if there will be found and activated a Complex Information Security System (CISS), which will cover the entire life cycle of computer systems (CS), starting from design and ending up with recycling, and all the technological link of collection, storage, processing and transmission of information. Therefore, the main purpose of the research in this paper is the development of integrated protection, which will prevent physical access to confidential information, its copying, theft or damage in server rooms. The use of modern high-level programming language Python and symmetric codifying algorithm AES allows the programming part of complex protection to work as quickly as possible, which leads to a rapid transfer of data from personal computer to remote server. Developed CISS allows keeping of confidential information even in a case of unauthorized access and theft of equipment. Program part allows reservation of data to 50 Mb (after the SMTP protocol) and more than 50 Mb (after the FTP protocol), speed of operation in this case is 15–20 sec (after the SMTP protocol) and 2–3 sec (after FTP protocol) if dimensions of file is 50 Mb. Thanks to using symmetric cryptosystem AES-256 which has a length of key of 256 bit we reached to obtain maximum crypto stability if compare with alternative software-hardware complex information security system Secret Disk Secret NG 3.2 which uses cryptosystem DES with length of key of 56 bit. For instance to 'crack' AES-256 we need approximate $3,78 \times 10^{63}$ years provided that you go over million keys per second.

The developed system can be used in all fields of application whose work is connected with the use of server rooms and who have no need in high qualified staff to servicing this system. Therefore, if compared to alternative CISS, the one reviewed in the article is more reliable thanks to newer encryption algorithm and capability to prevent data losses in the case of unauthorized access to the room.

Keywords: complex security, server room, AES-256, Python, data reservation.

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