
Abstracts and Keywords

E.R. Antysheva, E.V. Bakulina, I.A. Ponkratenkova

The Impact of Artificial Intelligence on the Financial and Economic Activities of Organizations

Keywords: audit; artificial intelligence; machine learning; neural networks; risks; financial statements.

Abstract. Not only information from accounting is subjected to modern audit, but also information obtained in the study of economic, technological and managerial processes, the sources of which are both internal and external open data and Internet sites. The paper aims to analyze the financial activities of a number of companies, supported by a coefficient calculation. To achieve this goal, a number of tasks were identified: to analyze the financial statements of companies, conduct a financial analysis, and propose solutions to identified problems. The hypothesis of the study is that the introduction of artificial intelligence into the audit process will lead to the optimization of information processing, which in turn will lead to an increase in competitiveness, financial stability and profitability of sales. The following methods were applied: information synthesis, systematization, logic, and financial analysis.

A.A. Belka

Methods and Algorithms of Biometric Authentication

Keywords: biometric parameters; authentication; protected electronic document management; identification.

Abstract. The article aims to review the main existing biometric parameters for user identification and authentication and methods for processing this information. The research hypothesis is to determine the optimal biometric parameter for the subsequent creation of a crypto-resistant algorithm. Methods based on phase correlation and search for intersection points are used. As a result, the main milestones in the development of an algorithm for accessing and encrypting electronic documents based on biometric systems were determined. The most appropriate to use is the method enhanced by additional encryption, based on the search for branching points of the vessels of the human retina.

O.D. Bondarev

The IDEF0 Model of Information-Analytical System for Processing Large Data Arrays

Keywords: IDEF0; data; information system; security; cyber threat.

Abstract. The IDEF0 model is a widely used model for the analysis and design of information and analytical systems that process large amounts of data. Visually represents the functions, inputs, outputs, and controls of the system, providing a clear understanding of the goals and processes of the system. The IDEF0 model allows developers to break down complex systems into smaller, more manageable components, making it easier to identify potential problems and areas for improvement. The model also allows developers to effectively communicate their ideas to stakeholders, ensuring that everyone has a clear understanding of the purpose and capabilities of the system. In general, the IDEF0 model is an indispensable tool for designing efficient and effective information and analytical systems for processing large amounts of data.

Disambiguation Method for Estimating Navigation Parameters of Multiple RF Radiation Sources

Keywords: radio frequency radiation; navigation parameters; radiophysics.

Abstract. The relevance of the topic is determined by the fact that the task of simultaneous positioning of several sources of radio frequency radiation is complicated by the need to unambiguously determine the set of navigation parameters for each source. The novelty of the research consists in proposing an algorithm for disambiguating the correspondence between mutual time delays in signal propagation. The algorithm is based on the criterion of time delay consistency. The results are as follows: mutual time delays obtained by using and analyzing the signal mutual uncertainty function are considered; the conditions for the applicability of the algorithm and its stability to the noise level in the studied channels are analyzed.

A.V. Gorelik, D.V. Astapenko, N.V. Bugreev, A.S. Veselova, A.N. Malykh

Calculation of the Required Value of Labor for the Performance of Additional Works in the Department of Automation and Telemechanics

Keywords: additional work in the department of automation and telemechanics; organization of production; work planning; increase in labor productivity; time reserve.

Abstract. The purpose of the article is to study the problem of rational planning of production activities in the department of automation and telemechanics. The hypothesis of the study is that the savings in investment costs and operating costs significantly depend on the efficiency of planning activities in the automation and telemechanics department. To achieve this goal, methods of selective research, rational distribution of resources were used. An approach is proposed that makes it possible to make the most complete accounting of the labor costs of workers in the automation and telemechanics department, material and technological costs necessary for the technical operation of RAT systems and devices, optimize the planning and budgeting process, and also increase the efficiency of applying lean production methods in the automation and telemechanics department.

V.O. Groppen

Modular Enumeration – a New Technology for a Wide Range of Problems Quickly Solving

Keywords: gain in time; modular enumeration; definite integrals; experimental verification; efficiency.

Abstract. The purpose of the work is to study the efficiency of modular enumeration in relation to problems with continuous variables. The main idea of modular enumeration is in minimization of repetitive calculations during the search for a solution. An analytical analysis of the effectiveness of this method in relation to the above-named class of problems and the results of its experimental verification in relation to the problem of calculating definite multiple integrals are presented.

I.V. Zaitseva, S.S. Novikova, V.V. Zakharov, N.I. Zakharova

Mathematical Modeling of the Solution of the Placement Problem

Keywords: modeling; optimization; research; functionality; lower estimates; top estimates.

Abstract. In the paper, the placement problem is formulated in the form of a model of integer linear programming, for which the method of dynamic decomposition is detailed and the method of their exact or approximate solution is used. The aim of the research is to develop a mathematical model for

studying the process of solving the placement problem. The tasks include mathematical formalization of the process, and specifically, finding the value of the functional of the dual problem, which is used as a lower estimate for the functionality of the original problem, while the solution is used to build an approximate integer solution of the original problem, thereby calculating the score from above for the optimal value of the functionality of the original problem. The obtained lower and upper estimates are used in the scheme of branches and boundaries to build an optimal solution or an approximate solution with estimates of its deviation from the optimal one. The resulting scheme for solving the problem of placement allows you to conduct a study of the placement of resources.

D.O. Lavrentiev, V.Yu. Belash

The Development of a Client-Server Cross-Platform Application Using Modern Technologies

Keywords: development; cross-platform application; dart; Flutter; IntelliJ IDEA; PostgreSQL; SQL; RESTful API; HTTP request; client-server; network architecture; DB; DBMS.

Abstract. This article describes the process of developing a cross-platform application that supports client-server network architecture. The general structure of the creation of educational applications is determined by the example of the software “Electronic Journal”. Schematics of the network architecture and the process of exchanging requests between the client and the server have been prepared. The purpose of the research is to create a cross-platform software product to provide information support for the work of a teacher in an educational institution (monitoring progress, attendance and performance of work by students). The hypothesis of the study lies in the popularity of the application being developed among users, as well as in the convenience of using such software in educational institutions. The research methods are analysis of the literature on application development, idealization and formalization of ideas about the implementation of software products, testing and analysis of statistical data. The results are as follows: the created cross-platform application is prepared for implementation in the educational process.

B.S. Sadovskiy

A Comparative Study of the Performance of Basic Operations on Vectors in the Implementation of Qt and STL (GCC)

Keywords: STL; std::vector; Qt; QVector; insertion and indexing methods; C++.

Abstract. The purpose of the article is to determine more efficient implementations of a vector container, when performing operations of inserting elements at the end, at the beginning, in the middle and accessing an element in the middle of the vector. To achieve this goal, the following tasks were completed: (1) the algorithm of initialization of the vector during each operation is defined; (2) the methods of the vector type container from the Qt library are defined similar to the methods of the container from the standard C++ library; (3) the algorithms for working with methods when testing their performance are defined; (4) an application implementing these algorithms has been written; (5) testing was carried out with the fixation of the performance readings of the methods of the container type vector. The hypothesis of the study is the assumption that the implementation of the vector container from GNU works faster than from Qt. The research method is experimental testing of basic operations with a vector.

M.S. Khusainov, A.M. Khafizov

Implementation Methods for Catalyst Dosing Control System in Yokogawa CENTUM VP Distributed Control System

Keywords: control system; dosing; catalyst; functional block; CALCU.

Abstract. The aim of the work is to develop a catalyst dosing control system in the Yokogawa

CENTUM VP distributed control system. The task of the work is to consider ways to implement a dosing system using various functionality of CENTUM VP. As a result of the study, it was found that the SFC functional block is the best option for transferring the dosing system, as it provides ease of perception of information and allows you to solve the problem in various ways.

E.G. Tsarkova

Dynamic Management Model of the Departmental Electronic Document Management System

Keywords: electronic document management; queuing system; resource management; optimal management problem; optimization problem.

Abstract. The aim of the study is to improve the system of departmental electronic document management (EDMS) through the use of decision support algorithms. Forecasting and reliability management of EDMS can be carried out using a mathematical model of the system operation. The main objectives of the study are the development and study of a mathematical model of the electronic document management process of the executive authority. The paper presents a dynamic model of the electronic document management system, which serves to ensure the possibility of predicting the workload of the system in a wide range of parameters, as well as optimizing the processing of document flows both at the stage of system design and during its operation.

N.N. Nagornyi

Applying Agile Approaches to Web Application Software Development

Keywords: agile transformation; technical support development; software; web application.

Abstract. The article deals with the subject of web application software development. The purpose of the article is to study the application of Agile approaches in the development of web application software. The object of the study is the project management processes for developing web application software within the framework of agile transformation. The subject of the research is technical support for the development of web application software within the framework of agile transformation. As a result of the study, an actual scientific and applied problem was solved, namely, the theoretical basis of agile was formed - the transformation of project management for developing web application software. It has been established that the use of agile methodology in combination with project-oriented management is one of the main options for obtaining competitive advantages in a dynamic competitive environment for technical support of web application software development.

A.V. Popova , D.V. Egorova, V.R. Muromskiy

Identification of Indicators for the Translation of Business Processes into a Single Information System

Keywords: automation; software; digital transformation; enterprise management; cost; efficiency assessment.

Abstract. The article discusses the methodology for identifying the most important processes and operations, on the basis of which the priority tasks of complex automation will be determined, process groups and their automation features are highlighted. The article aims to determine the priority business processes in an organization for the implementation of a unified information system by the criteria of importance, problematic nature and the possibility of changes. The tasks are to identify priority processes for their translation into a single information system, classify them. The hypothesis is based on the assumption that identification of priority areas of business processes at the enterprises of the rocket and space industry will increase the efficiency of the introduction of a unified information system. The study

resulted in proposing an approach to identify priority processes for translation into a single information system.

M.L. Sagidova

Problems and Ways to Ensure Information Security of Industrial Enterprises

Keywords: information security; industrial organizations; information security; protection of industrial networks.

Abstract. The article deals with the problems and ways of ensuring the information security of industrial enterprises. It is noted that the protection of information, which is processed within the framework of the enterprise, is a set of measures, the purpose of which is to address the issues of ensuring the protection of the information environment of the organization. The common risks in the framework of the functioning of the automated control system have been identified. Particular attention is paid to the approach based on the detection of anomalies. An anomaly should be understood as a certain state of a system or network, which has significant differences from other typical operating states. The categories of the information security model are described. Typical threats to information security are identified. It is concluded that the process of ensuring the protection of industrial networks that ensure the functioning of ACS tools is always a compromise, the solution of which comes down to choosing the ratio of accuracy / versatility of the protection system that detects anomalous behavior. This technology, together with the use of machine learning techniques, will make it possible to achieve the most correct determination of anomalous conditions within the industrial network and automated control system equipment.

A.D. Abakumov

Device for Measuring and Monitoring the Temperature Regimes of Technical Devices

Keywords: measurement; control; diagnostics; temperature; electrical devices.

Abstract. The reliability of the operation of most technical devices depends on the temperature conditions of their operation, and therefore multipoint temperature control is an urgent task. The article discusses the development of a device for measuring and monitoring the temperature conditions of technical devices with synchronization of the received data to the server via the Ethernet protocol. Electrical circuits of the device for measuring and monitoring the temperature regimes of technical devices have been developed.

Alaq S.B. Alkhaleeli, E.A. Lukyanov

Stochastic Estimation of Planning Trajectory in the Environment with Dynamic Obstacles

Keywords: mobile robot; trajectory planning; stochastic estimation; robot motion control.

Abstract. To control group of mobile robots, it is necessary to solve a number of tasks that provide navigation of the mobile robot, planning the trajectories and controlling the movement of the robot in its operation environment. To solve these problems, a lot of methods and algorithms have been developed, however, many of them cannot ensure the efficient functioning of a mobile robot in non-deterministic conditions, in the presence of fixed and movable obstacles with speeds and directions of dynamic obstacles can change randomly. The article proposed an efficient algorithm to control the movement and planning path of a mobile robot to reach the target point safely in the presence of static and dynamic obstacles. Planning the trajectories of a mobile robot, assessing the probability of a collision and

making decisions to avoid obstacles are discussed. A prediction method of changings that happened in the environment of mobile robot based on a priori information and information received from the information-sensor subsystem is proposed.

S.I. Zaitov

Non-Contact Temperature Measurement Device

Keywords: measurement; non-contact measurement; temperature; circuit; sensitivity.

Abstract. The article is devoted to the development of a non-contact temperature measurement device. The project included the design of a structural block diagram of the device, followed by the development of a functional diagram based on it. The device can accurately measure temperature without physical contact, making it ideal for a range of applications. The article provides a detailed description of the device and its functionality, developed a non-contact temperature measurement device.

V.I. Milushkov, N.N. Limansky, A.V. Lavruk, I.G. Babylev

Artificial Intelligence in Education

Keywords: automation; future of work; time; inequality; technology; humanity.

Abstract. The article explores the impact of digital automation on cultural dynamics in society. Scenarios of changing jobs and professions, as well as opportunities for retraining, are considered. The authors use statistical analysis and databases to identify transitional professions. The results show that human social practices and technology interact, and automation cannot fully replace the human factor.

D.A. Myslimov

A Device for Measuring Atmospheric Electric Field Strength

Keywords: measurement; electric field; ionosphere; electrical strength; Multisim.

Abstract. The development of new methods and devices for measuring the strength of the atmospheric electric field is extremely important not only for the development of modern meteorology, but also for improving the accuracy of predicting weather anomalies, and therefore is an urgent task of our time. The goal is to develop a device for measuring the atmospheric electric field strength and modeling the operation of its functional blocks. Electrical circuits of the device have been developed; the calculation of the functional blocks of the device for measuring the intensity of the atmospheric electric field was made. The simulation of the operation of the DC / DC converter in the NI Multisim software package was performed, the power spectral density of the noise at the output of the converter was determined. The results obtained can be used in the design of new systems for detecting and registering weather anomalies based on an intelligent analysis of the atmospheric electric field strength.

R.S. Polyakov

The Development of a Measuring Digital Low-Frequency Generator

Keywords: generator; control; microcontroller; meter; signal.

Abstract. The aim of the work is to develop a measuring digital low-frequency generator that allows you to generate signals of various shapes with the amplitude of up to 10 V. An example of generated signals: sine, cosine, saw, reverse saw, triangle, various pulses of a special shape. For this, within the

framework of this article, structural and functional electrical circuits of a measuring digital low-frequency generator have been developed. The basic error of the device was estimated.

M.G. Popov

A Device for Setting and Diagnosing Electronic Components

Keywords: measurement; control; diagnostics; electronic components; MicroCap; Statistica.

Abstract. A study of a device for tuning and diagnosing electronic components was carried out by the method of planning an experiment, which made it possible to determine the regression equations, the solution of which helped to find the parameters of the elements of the measuring circuit during the diagnostics of the board. The designed device provides the verification algorithm set out in the instructions for setting up, checking and technological run FIASH.436218.079 IN, FIASH.436218.081 IN and FIASH.436218.047 IN. The stand provides the ability to quickly adjust to adjust and test a specific type of control board TEPCOM ST-222, TEPCOM ST-555 or TEPCOM ST-888, as well as modifications of these boards.

E.A. Rudik

The Development of the AC Calibrator

Keywords: calibrator; alternating current; frequency; circuit.

Abstract. The purpose of this article is to develop an AC calibrator, which is an accurate current source and serves to calibrate (verify) electrical measuring instruments, including at their installation site due to the high mobility of the calibrator and the short time to establish the operating mode, operating on a sinusoidal current up to $\pm 10A$ and frequency up to 100 kHz. The task is formulated and the urgency of the problem is described. A block diagram of the designed device has been developed. On the basis of the block diagram, a functional diagram of the device was developed and its description was made.

M.S. Chumakov

Instantaneous Speed Measurement Device by LL-type Coordinate Function and Automatic Continuous Determination of the Scaling Factor

Keywords: railgun; speed measurement; signal; circuits.

Abstract. This article discusses the techniques used to record the acceleration of bodies at singular points of the railgun channel. A device for measuring instantaneous velocity was developed using the LL-type coordinate function and automatic continuous determination of the scaling factor. Structural and functional diagrams of the device have been developed.

V.S. Nepomnyashchy, S.O. Sergaev, M.A. Zyryanov

A Study of the Process of Needle Separation

Keywords: biomass; wood; needles; waste; trunk; tree greens.

Abstract. In our time, the issue of processing woody greenery is relevant. Tree greens are an important raw material; they are used in many industries: animal feed, medicine, perfumery and many others. Tree greens make up approximately 3–5 % of the total tree biomass. Coniferous-vitamin flour contains many vitamins: C, D, K, E, A, B₂ and others. As a result, the purpose of the study is to analyze the processing of needles. To achieve this goal, it is necessary to analyze the design features of needle processing machines, compare them with each other and summarize their advantages and

disadvantages. Most of the research was carried out based on the analytical method. The main direction of research is the study of scientific literature on the topic of work. The results of the research will find wide application in the harvesting and processing of coniferous trees.

M.V. Gagayeva

Opportunities for Schoolchildren to Participate in Initiative Budgeting in Russia

Keywords: school initiative budgeting; budget.

Abstract. The article aims to study the possibilities of participation of schoolchildren in the process of initiative budgeting in Russia.

The objective is to systematize the opportunities for schoolchildren to participate in the process of school initiative budgeting. Identification of the boundary conditions of this process, when initiative budgeting becomes directive. The hypothesis is based on the assumption that in Russia, there are different opportunities for schoolchildren to participate in initiative budgeting. Methods of analysis and synthesis, comparison, generalization, graphical method, etc. have been applied.

As a result of the study, the author's interpretation of the concept of school initiative budgeting is proposed. The author's methodology for assessing the degree of participation of schoolchildren in the process of school initiative budgeting has been developed. The features of this process and the borderline states, when the "initiative" becomes a "directive", are revealed.

N.A. Goncharova, N.V. Zolotareva, K.V. Sergeev

The Post-Pandemic Condition of Household Liquid Financial Assets

Keywords: households; financial assets; capital; government support; pandemic; financial vulnerability.

Abstract. The purpose of the article is to conduct a comparative analysis of the financial well-being of households after the Covid-19 pandemic. The objectives of the article are to analyze the multifaceted impact of the Covid-19 pandemic on consumer behavior, to examine projections of household liquid financial assets post-pandemic. The research hypothesis is as follows: the authors consider the genesis and interaction of global financial problems at the present stage. The research methods are qualitative and quantitative analysis of the financial well-being of households after the Covid-19 pandemic. In conclusion, recommendations are given to help households improve their financial situation.

L.A. Kovalerova, E.A. Savinova, O.V. Bespalova

Credit Activity of a Commercial Bank with Individuals and Directions for Its Improvement

Keywords: credit activity; commercial bank; credit relations; banking activities; operations and transactions; development directions; national banking system; credit risks; improvement of activities.

Abstract. The article analyzes the credit activity of the bank in the conditions of instability of the economic situation and the multidirectional dynamics of real incomes of citizens. The purpose of the study is to find the most successful ways to develop the bank's lending activities. This topic is the most relevant in connection with the rapid growth of creditworthiness of the population and the accumulation of risks of non-repayment of loans. The hypothesis of the study is aimed at ensuring the stable functioning of banks and the banking system. A comparative analysis of the types of lending and their impact on the development of the economy is carried out. As a result of the research, ways to improve the efficiency of the bank's credit relations with individuals are proposed, including the

creation of a clear system of subordination, further development of the remote service system and the development of the bank's ecosystem, analysis of internal business processes and assessment of the client's creditworthiness.

E.V. Kostoustova, I.V. Shadrina, L.N. Ridet, T.V. Dubrovskaya

On Investments in Hard-To-Recover Reserves

Keywords: hard-to-recover oil reserves; high-viscosity oil; investments; mineral extraction tax; production cost; financial costs; deposit; developed deposits.

Abstract. The purpose of the study is the economic aspects of the investment activity of participants in the oil and gas industry in the field of hard-to-recover resources. To achieve the goal, it is necessary to characterize the basic concepts within the framework of the research topic, determine the need to increase the volume of investments in hard-to-recover oil reserves, and areas of activity. The methods of analysis and comparison were used in the study. The formulated conclusions will be used in further scientific research.

G.K. Khamidullina, D.R. Fakhreeva, E.M. Khusnutdinova, E.S. Karataeva

Importance of Product Quality Assessment for Manufacturers

Keywords: customer satisfaction assessment; SWOT-analysis; QFD-analysis.

Abstract. The purpose of the study is to assess consumer satisfaction in the provision of services for the examination of the quality of goods on the example of LLC "National Institute of Quality". The research objectives are to conduct a survey to assess customer satisfaction, conducting a SWOT analysis, to conduct a QFD analysis. The hypothesis is based on the assumption that the correct conduct of customer satisfaction assessment affects the quality of services provided. Scientific methods used in this article: analysis, generalization and synthesis. The main result of the work is the identification of consumer satisfaction problems on the example of the provision of services for the examination of the quality of goods.

E.Yu. Zlobina, E.F. Galiamova

Features and Trends in the Development of the Global Arms and Military Equipment Market

Keywords: military-industrial complex; military-industrial complex; weapons and military equipment; the world market of military equipment; arms exports; arms imports.

Abstract. The article discusses the features of the development of the military-industrial complex and the world market of weapons and military equipment. The key players are listed – the exporting and importing countries of AVE. A large place in the work is given to the consideration of issues of the development of the defense industry of Russia. The purpose of the study is to identify the problems faced by Russian defense industry enterprises at this stage. The tasks set by the authors include: studying the dynamics of indicators characterizing the development of the military-industrial complex in different countries, including in Russia; describing key trends in the world market of military equipment; determining the impact of military spending on the country's economy. Research methods: study and generalization, collection and structuring of information, analysis and comparison, statistical methods of data processing.

Sustainable Water Use: Regional Aspect (Case of the Rostov Region)

Keywords: sustainable water use; ecological water use; region; water resources of the Rostov region; anthropogenic impact; technogenic pressure.

Abstract. The purpose of the study is to verify the priority areas of sustainable water use in the context of environmentally-oriented development of the region. The scientific novelty lies in the refinement of the regional aspect of the concept of integrated water resources management as a systemic process that ensures a balanced consumption of not only water, but also related resources. In the course of the study, the following tasks were completed: monitoring of the consequences of technogenic and anthropogenic impact on water bodies of the Rostov region was carried out, the need to apply the basin approach in the water management system was verified, and ways to solve the emerging socio-ecological and economic problems in the sustainable development paradigm were proposed. The methodological base of the research includes the analysis of official statistical data, grouping, and synthesis. The results of scientific research are as follows: integrated water use management at the regional level will allow for a comprehensive accounting of all possible sources of water resource benefits, promotes the linkage of intersectoral interests and intensifies the involvement of water users in the processes of environmentally oriented consumption.

E.R. Sadykova, F.N. Shaykhutdinova, E.A. Prokhorova, Yu.A. Rakhimzyanova

Changes in Tourist Flows of the EAEU Countries in the Conditions of Deglobalization of the World Economy

Keywords: world economy; EAEU countries; deglobalization of economy; inbound trips; outbound trips; tourism; dynamics.

Abstract. The study aims to establish and justify changes in tourist flows between the EAEU countries due to the reduction of Russia's economic contacts in the world market. The objectives are to present the importance of tourism for the integration development of the EAEU countries in the context of deglobalization of the economy; to assess the dynamics of changes in the number of tourist trips during the periods of pandemic, post-pandemic and SMO. The hypothesis is as follows: in the conditions of deglobalization of the world economy, tourist flows within the framework of integration associations are increasing. The research methods are statistical studies on the algorithm for estimating the number of tourist trips. The results are as follows: the following dynamics have been identified and substantiated: a decrease in the tourist flow between Russia and other EAEU countries during the pandemic and the natural deglobalization of the tourism sector; tourism recovery during the post-pandemic period; a significant increase in the number of tourist entries and exits during the period of artificial displacement of Russia from the world economy.