INFORMATION TECHNOLOGIES

DEVELOPMENT OF ARCHITECTURAL MODELS OF INTERACTION OF VIRTUAL COMMUNITIES FOR ORGANIZING THE COLLECTIVE DOCUMENTATION PROCESS

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The object of this research is organizational methods of virtual community creation in web area. In this article were released researches of concerning types, communicative features, information behavior, distribution of possible roles among web participants of virtual communities, methods of their organizing and management. The research was identified strengths and weaknesses of all types of virtual communities with their main opportunities in the web space. Main principles of communicative peculiarities among participants from one virtual community of each organization type were given. The main problems caused by opportunities in collaboration among different web communities. It causes uncontrollable data flows, which can have influences on a content generation process. There were analyzed a positioning of different virtual communities types. It was identified all possible integrational variations among different virtual communities. This depends on positioning principle of different web communities' types in the web area. There were proposed three main architectural paradigms of virtual community creation. The choosing of each of them depends on necessity of data flow management for improving content quality and communication safety between different participants. Each of these paradigms has some strength and weaknesses. The own web service development is the best solution for data flow isolation from other web communities and safety. Free web services contain local virtual communities, which are contains a global one. Collaboration between different virtual communities can cause unnecessary informational behavior of their participants. The interesting method is to combine proposed paradigms. According to the results, authors proposed situational methods of architectural organizing of virtual communities. Each of them has some benefits and weak sides.

Keywords: virtual community, collaborative documentation, informational behavior, data flows, architectural types of web communities.

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SYSTEMS AND CONTROL PROCESSES

METHODOLOGICAL SUPPORT FOR FORMATION OF RESOURCE REQUIREMENTS IN MULTI-PROJECT ENVIRONMENT

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The object of research is the processes of human resource management of projects in a multi-project environment. In a multi-project environment, the level of team autonomy within an organization can be different, and the lack of a resource control

system at the portfolio level reduces the effectiveness of critical organization knowledge management. The main hypothesis of the study is the assumption that an adequate understanding of customer requirements is crucial to ensure project management, and the effectiveness of human resource management in a multi-project environment depends on the effectiveness of determining resource requirements in the formation of project teams.

During the study, methods of system analysis are used in the study of human resource management processes and modeling of the formation of requirements for the project team. A competency-based approach is also used in the development of a method for generating resource requirements and an optimization theory apparatus for formulating and solving problems of forming project teams in multi-project environment under given restrictions.

In order to reduce the likelihood of resource conflicts, it is proposed to analyze the initial data when forming requirements for the project team. Coordination of resource requirements at the stage of team formation will reduce the risks of resource conflicts during the implementation of projects included in the project portfolio. Possible results of the analysis of stakeholder requirements are considered.

A method for generating resource requirements in a multi-project environment is proposed, based on an analysis of stakeholder interest in human resource management processes, taking into account the loyalty of stakeholders, which, unlike existing ones, takes into account the consistency of resource constraints defined by stakeholders. This will allow the formation of agreed requirements for the resources of projects and programs.

The generated requirements are the initial data for building project teams using the proposed method of forming teams in a multi-project environment. A model of the process of forming requirements for the project team is built. For the purpose of automation, a software package has been developed that allows to generate options for building project teams with an indication of the characteristics of the options, which will further optimize the composition of the team.

Keywords: project management, resource requirements for projects and programs, multi-project environment, project team, project stakeholders.

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SECURITY ASSURANCE OF PORT SERVICES AS A FACTOR OF THEIR COMPETITIVENESS

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The object of research is the process of increasing the competitiveness of ports. One of the most problematic places is the endlessness of the services provided by ports, which affects the competitiveness of ports.

The methods for quantitative assessment of the possibility of reliable delivery, methods for calculating the parameters of the infrastructure and superstructure of ports, solution methods using the theory of mass service are used.

The analysis of research and the work of international organizations on the determination of factors by the clientele of ports

are carried out, given the change of priorities in favor of the reliability of the service. Ports today are considered in this sense as nodes in logistics chains. Under the conditions by which supply chains are developed, evaluated and selected, reliability is given priority over the price and transit time.

It is determined that the ability of ports to ensure the reliability of the service should be considered from the perspective of creating the appropriate capacities as part of the infrastructure and port superstructure, as well as labor resources. For each element (berths, warehouses, equipment, dockers) it is determined in the selected tested methods, due to which reliability is ensured. So, the required number of berths is determined taking into account their annual throughput, which is justified taking into account the coefficient of berth utilization in time, the use of which allows ensuring the reliability of the availability of the required number of berths.

The reliability of the availability of the necessary storage capacity is determined from the conditions for ensuring uninterrupted fleet processing. The necessary composition of transshipment equipment depends on the processing conditions of the fleet. Reliability in providing labor resources can be ensured by taking into account the peculiarities of the organization of labor in ports associated with irregular demand for workers due to intermittent and unpredictable arrival of ships and cargo at the port.

The definition of favorable port cargo flows, taking into account additional sales and customer loyalty, and an efficiency criterion, the task of determining the number of dockers, segmentation of ship-owners, is proposed. As a result, a scientific and methodological product is developed suitable for use as suppliers and customers of cargo delivery services.

Keywords: reliability of transport services, seaports of Ukraine, port competitiveness, port infrastructure and superstructure.

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DEVELOPMENT OF TRANSPORT AND TECHNOLOGICAL PROCESS OPTIONS' CONCEPT FOR GOODS DELIVERY WITH PARTICIPATION OF MARITIME TRANSPORT

page 24–29

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The object of research is the transport and technological process of cargo delivery with the participation of sea transport. One of the reasons for the ineffective delivery of goods using sea transport is the lack of a theoretical basis for an integrated review of the transport and technological delivery process within the entire delivery system. This accordingly affects the practical implementation of the delivery of goods. The traditional approach involves consideration of the transport and technological process within one of the delivery areas and relies on the appropriate transport and technological system. The modern transport market and the technological base of port terminals allow to vary and combine transport technologies at various sections of cargo delivery. This determines the corresponding multivariance of the transport and technological process with its integral consideration. This approach is the ideological basis of this study.

Two levels of consideration of the transport and technological process are established. The first is the level of individual participants in the cargo delivery process (for example, a port terminal, a sea carrier). The second is the level of the entire delivery system from the point of departure to the place of transfer of responsibility for the two parties to the foreign trade contract. The level of consideration of the transport and technological process determines the controllability of this process. In its integral consideration, the transport and technological process acts as a control object for the delivery organizer/cargo owner. A correspondence has been established between transport-technological systems and the transport-technological delivery process, according to which the latter can use a combination of several

transport-technological systems as the technological basis. The main options of the transport and technological delivery process (for example, export) with the participation of sea transport by varying various transport and technological systems at different delivery sites are determined. The boundaries of variation by the transport and technological delivery process depending on the basis of delivery are justified.

The results of this research provide an opportunity to increase the efficiency of transport support of foreign trade contracts due to the integrated consideration of various technologies within a single delivery system. Further development of these results is focused on optimizing the parameters of the delivery process in accordance with a given criterion and limiting conditions.

Keywords: transport and technological system, cargo delivery, sea transport, port terminal, sea carrier, delivery basis.

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REPORTS ON RESEARCH PROJECTS

DEVELOPMENT OF BLIND FRAME SYNCHRONIZATION FOR TRANSFER SYSTEM WITH DIFFERENTIAL SPACE-TIME BLOCK CODING

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The object of this research is the methods and algorithms for frame synchronization used in multi-antenna radio systems (Multiple Input Multiple Output – MIMO). The implementation of radio communication systems and, in particular, MIMO, implies that the demodulator synchronizes the phase of the reference carrier and the time of signal processing processes. Time synchronization is divided into symbolic and frame synchronization. As for the synchronization of the reference carrier and symbol synchronization, these types of synchronization are provided by traditional methods and are not considered in this paper. The frame synchronization in the vast majority of cases is provided by the use of pilot signals (sync words). At their core, they are markers and are periodically embedded in the data stream to indicate the beginning of another new data block. The resources of the transmission system, spent on the transmission of pilot signals, are not used to transmit user information, as a result of which the efficiency of using the time-frequency resource of the system is degraded. To a lesser extent, there are so-called «blind» signal processing methods based on the redundancy properties of the transmitted signal. These methods have no drawbacks from the use of pilot signals and are divided into methods for assessing the state of the communication channel, signal identification,

and synchronization. Based on this, such methods are of practical interest.

In this work, let's propose a frame synchronization method for demodulating differential space-time block coding signals using MIMO technology. The synchronization algorithm does not require the use of preambles and sync words, which ensure efficient use of the time-frequency resource. An analysis of the structure of the algorithm and the simulation results show its performance at low signal-to-noise ratios in the transmission system. The algorithm does not require knowledge of the state of the communication channel, has low computational complexity compared to existing analogues, and allows implementation with a different number of transmitting and receiving antennas.

Keywords: MIMO system, frame synchronization, pilot signal, time-frequency resource, blind signal processing method, space-time signal redundancy.

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DEVELOPMENT OF RESOURCE DISTRIBUTION MODEL OF AUTOMATED CONTROL SYSTEM OF SPECIAL PURPOSE IN CONDITIONS OF INSUFFICIENCY OF INFORMATION ON OPERATIONAL DEVELOPMENT

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The paper considers the task of allocating the resources of an automated control system for special purposes in conditions of insufficient information on the development of the operational situation. The object of research is an automated control system for special purposes in the face of uncertainty in the operational environment and limited computing resources. One of the most problematic places in the distribution of resources of an automated control system is the low quality of planning, distribution and use of resources of an automated system in conditions of insufficient information about the operational situation and the inability to predict the actions of the enemy. This reduces the efficiency of both the system itself and its application. The scientific problem is solved with the help of developing a model for the distribution of system resources with the possible appearance of a lot of perturbations at the input, taking into account the features of the current operational situation in the course of the armed conflict and allows forecasting the state of the automated control system. In the course of the study, the authors of the work used the basic principles of queuing theory, automation theory, the theory of complex technical systems, as well as general scientific methods of cognition, namely analysis and synthesis. The novelty of the proposed model lies in the fact that it allows to justify the decomposition of the system. This

allows to present a solution to the vector optimization problem in the binary relations of conflict, assistance and indifference. It also takes into account the operational environment and allows predicting the state of the system taking into account external influences, constructing utility functions and guaranteed payoff, as well as a numerical optimization scheme on this set. The proposed model will improve the efficiency of information processing due to its distribution and rational use of available computing resources. It is advisable to use the research results when planning the configuration of the data transmission system and at the stage of operational control of the resources of these systems.

Keywords: control systems, operational environment, planning quality, binary conflict ratio, efficiency of information transfer.

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EXPANDING THE FUNCTIONALITY OF LEARNING MANAGEMENT SYSTEMS AND ANALYSIS OF THE IMPLEMENTATION RESULTS

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An important function of the introduction of electronic learning systems and learning management is time management, or schedule. This function is undeservedly ignored by most systems of this class (LMS – Learning Management System), despite their relevance. This is especially true of systems of classical, full-time education in classes. So, the object of research is the learning management system, that is, the automation of the educational process management functions. One of the objectives of the learning planning process is scheduling. This work is dedicated to this very task.

One of the options for solving this problem is considered in the work – the use of an adapted approach to scheduling work from the mass service sector to the problem of planning the work of an educational institution and scheduling classes to meet the needs of the educational process is proposed. Compared with other known methods, which are predominantly of «exhaustive» type, this method is less costly and shows good results in practical applications. That is, compiled schedules are suitable and require little additional human costs.

The positive results of the implementation of the developed software product are obtained and demonstrated using specific examples: improving the quality of work of the management team, methodologists and teachers. The resulting schedules turn out to be qualitative – appropriate or exceed expectations. This is due to the similarity of planning approaches used to solve problems in both areas – managing call center personnel and scheduling for a school or university. Improved management of the training schedule – in particular, indicators of the process of making changes to the lesson schedule.

The novelty and main value of the work lies in the transfer and adaptation of known methods to solve new problems. Thus, it is possible to solve the well-known problem with a new method adapted and adapted to new needs. Moreover, this method is quite effective in terms of time costs.

Keywords: scheduling, learning management system, change management, local optimization, minimization of maxima.

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