ABSTRACT AND REFERENCES

CONTROL PROCESSES

PROCESS IMPROVEMENT OF COMBINED CARGO TRANSPORT (p. 4-8)

Anatoly Kotenko, Alexander Krasheninin, Olga Shapatina

Approaches to the bimodal transport organization are considered, bimodal transport technology, which eliminates the problem of "dead weight" in the form of automobile moving part that always goes with the car body is given in the paper.

Today the issues of a mutually beneficial association and interaction with the road transport using their positive aspects and neutralizing negative, and creating a combined form of transportation are urgent for the railway transport. Using combined transport becomes relevant also because of Ukraine's accession to the European transport system, where the railway track width differs from the track width in CIS states.

The constructed state graphs, determined based on solving a system of differential equations of motion in combined transport, allow to define the degree of management efficiency of combined cargo transport to support making optimal decisions by operatives in tasks that are solved at automated workplaces of railway operatives.

The considered technology of cargo transportation by railway transport with its gradual replacement by road transport at the bimodal transport system allows to carry cargos without changing the running gear, when the cargo owner has approach road that allows to reduce annual operating costs during cargo transport.

Keywords: combined transport processes, mathematical modeling of transport, state graphs of transport processes.

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CALCULATION FEATURES OF TRAFFIC LIGHT REGULATION REGIMESAT THE SIGNAL GROUP CONTROL (p. 9-13)

Vladimir Yeresov, Vyacheslav Trushevsky

The differences between the existing technologies of traffic light control by phases and signal groups were determined in the paper. It was proved that the signal group control technology is more perfect and to a greater extent corresponds to the changing traffic conditions at intersections. Approach for compiling the traffic light regulation cycle structure based on the analysis of conflict of traffic and pedestrian flows, taking into account traffic volume, the number of road accidents in the conflict zones was defined. Also, in compiling the structure, the need to reduce the delays of vehicles and pedestrians was taken into account. Based on the signal group control technology, an algorithm for determining the parameters of traffic light regime, taking into account the traffic light cycle structure optimization, compiled for implementation on a computer was proposed.

Using the developed approach will allow to increase the efficiency of traffic light regulation in both improving the traffic safety of vehicles and pedestrians and in reducing their delays before intersections.

Keywords: traffic light, optimization, separate directions, signal group, cycle, control, algorithm.

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EXTENSION OF METHODS OF INTELLIGENT CONTROL OF COMPLEX OBJECTS (p. 13-18)

Yevgen Kucherenko, Oleksandr Driuk

It was determined that the existing methods and models do not fully implement the object control strategy. The research problem statement was formulated as the control function optimization on a

set of restrictions. The need for modifying the existing models was shown. The modified model as a system of fuzzy production rules, which unlike the existing ones, expands the functional capabilities and improves the accuracy of intelligent object control, was implemented.

An ultra-fast annealing method that guarantees only a statistical finding of the global minimum was considered. A modification of the method, which greatly improves the quality of intelligent control by multiple findings of local optima at different initial approximations, was proposed.

The performed simulation experiments confirmed the effectiveness of the obtained solutions. The prospects for further studies were defined.

Keywords: mobile object, intelligent control function, production rules, ultra-fast annealing, modification.

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USE OF THE INFORMATION TECHNOLOGY OF DECISION SUPPORT IN INFORMATION SYSTEMS OF PARAMETERS OPTIMIZATION (p. 18-23)

Volodimir Romanovsky, Tetyana Zagorodnya

The paper proposes a decision support system (DSS) in semi-structured information system, which is a learning process. The proposed DSS is focused on teacher of technical discipline of the university department. The optimization criteria of the learning process model that is used in the DSS were determined. The optimization of the parameters of the educational discipline was carried out. The method of solving the problem of the decision support process optimization in choosing the parameters of the educational discipline, which allows to enhance the quality of education and the formed level of competencies in teaching students of technical specialties was improved.

The proposed DSS of the lecturer level greatly facilitates teacher's decision-making on the parameters of lessons in order to form the highest level of competencies of future specialist.

It was shown that the redistribution of training hours for independent work of students and classes in an appropriate ratio allows to improve the formed level of competencies. Improving the formed level of competencies is possible due to increasing all components of competencies.

The results describe the method of improving the decision-making process for solving weakly-formalized, semi-structured problems with incomplete and fuzzy data, which allows to optimize the param-

eters of classes of technical disciplines, increase the decision-making effectiveness of the teacher in forming the educational trajectory of student.

Keywords: decision support system, optimization, information system, mathematical model, competence.

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ANALYSIS OF THE MODELS OF COMMUNICATION BARRIERS OF COMPLEX PROJECTS BASED ON VALUE APPROACH (p. 23-28)

Tetiana Romaniv

The kinds, types, tools, technologies of communications and communication barriers were analyzed in the paper. Based on the analysis of the studied authors and their works, kinds of communications and communication barriers in projects were newly formed and grouped. The model and the method of the scheme of selection of redistribution of complex projects for the studied enterprises were developed. For an organization that aims to become project-oriented since the complexity of survival in conditions of high competition among similar organizations increases, forming portfolio approach based on value-oriented approach provides reducing communication barriers and noise, thus ultimately ensures sustainable development and implementation of complex projects.

Also, model and method of studying system representation of values by PLC phases were developed and analyzed. This model is represented both mathematically and graphically. It explains the relationship of the project development by the project life cycle phases, the level of human values that are shown in his personal characteristics, through which communication barriers may occur.

When analyzing the communication flow, interested parties reveal themselves in different ways. To date, it is necessary to pay more attention to the problems of overcoming communication barriers and noise in projects since their overcoming (neutralizing) will lead

to getting the planned product of the project with the corresponding value laid.

During the study, a pattern of the effect of systemic representation of human values throughout the life cycle on the project results that shows the level of values from the first to the eighth was found.

As a result of the studies, it was found that communication barriers that arise between the interested parties are characterized by gaps between the levels of values of project participants and will be overcome provided understanding of the underlying values of each of the parties.

Keywords: communication, communication barrier, project noise, value, complex project, project communications, communication noise.

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CONSTRUCTION OF AGGREGATES OF FEATURES OF THE BUILDING COMPLEX OF THE TERRITORY FOR CONCEPTUAL GROUPING SCHEME (p. 29-33)

Olga Zalunina

Improving the efficiency of the strategic development plans of the construction industry is possible by studying and elaborating the clustering algorithm of Ukrainian regions in the construction sphere.

The aggregation algorithm of the feature space of the building complex of the territory was considered in the paper.

The building complex of each area is described by a set of characteristics that can be called features. Herewith, the system of considered estimated figures cannot be fully used for the regional differentiation within the Ukraine since a number of indicators that form the system conditions are of national nature and do not contain a specific set of numerical and categorical data.

Achieving the goal of improving the efficiency of the strategic development of the construction industry is possible provided solving the following problem: to construct an aggregation algorithm of

features, allowing to determine the essential factors of influence and reduce the space dimension in clustering objects.

The algorithm, considered in the paper is based on using two criteria: the correlation coefficient and the consistency criterion. This allows to reduce the dimension of the feature space of the building complex of the territory.

As a result of the study, aggregates of indicators, in which the consistency criterion is equal to zero, were obtained.

A study of the proposed algorithm allows to conclude on the presence of consistent relationships between the indicators, forming the functioning of the building complex of the region. It is an intermediate step in constructing the conceptual grouping schema of areas, as well as allows to construct a more accurate clustering of areas for management decision-making in the construction sector.

Keywords: construction industry, building complex, feature space, consistency criterion, correlation coefficient.

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GENERALIZATION OF THE METHOD OF VIRTUAL OBJECT ON THE CALCULATIONS OF OPTIMUM PARAMETERS OF COMPLEX SYSTEMS (p. 33-37)

Lubov Bovnegra, Tatyana Lysenko, Andrew Stanovskyi

The increasing complexity of modern equipment leads to the fact that the optimization blocks, included in the CAD and ACS of these objects do not manage to take effective project or management deci-

sion in real time. The reason for that is the emergence: the presence of special properties in systems, not inherent in their elements, or the sum of elements, not linked by specific system-forming connections, as well as irreducibility of the system properties to the sum of the properties of its components.

Such systems have a high dimensionality and "irregularity" of properties. For example, the lumped-parameter elements (nodes) are combined with distributed-parameter elements (connections), protocols of the individual nodes are not coordinated in time, etc. Herewith, each such feature strongly complicates the design models of the object.

It was shown that modern computer-aided design and control needs new intelligent optimization techniques that allow on-line solution of the problem with using the mathematical apparatus of the virtual object.

The mathematical bases of the method were developed, classification of virtual objects was performed and their applicability for mechanical, electrical and hydraulic systems was substantiated.

Keywords: complex systems, design, control, on-line optimization, method of virtual object.

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FUNDAMENTALS OF THE STATISTICAL THEORY OF THE CONSTRUCTION OF CONTINUUM MODELS OF PRODUCTION LINES (p. 38-48)

Oleg Pignasty

The class of models of production systems with in-line production organization, introduced by the author (2003) and widely used nowadays for constructing effective control systems of production lines is discussed in the paper. Conceptual provisions of the statistical theory of production lines, operating in the transient and steady modes are considered. New types of models that allow to combine the self-consistent object-technology at the micro-level and flow at the macro-level descriptions of the production line are proposed. To build unsteady equations of state of the production line, analytical design methods of technological trajectories of objects of labor are developed. The design methods of technological trajectories are based on the laws of conservation of the number of transferred technology resources on the object of labor at a given space-time structure of the technological process. The developed design methods of technological trajectories were used to construct continuum models of production lines that operate in transient modes. To describe the stochastic process of the transfer of technology resources on the object of labor, the distribution function of objects by states is introduced. A kinetic model of transient processes, the equation of which for the first time contains terms that take into account the normative technological trajectories of objects of labor, and the mechanism of interaction of objects of labor among themselves and the process equipment is constructed. Using the kinetic equation, multi-moment balance equations of the continuum flow model of the production line are written. It is shown that the equations of the model of object-technology description are interrelated and coordinated with the balance equations of continuum flow models through the level of the kinetic description of the production process.

Keywords: PDE-model production line, work in progress, balance equations, equation of state.

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ASSESSMENT OF PROJECT POTENTIAL OF STEVEDORING COMPANY (p. 49-54)

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The problem of assessing the project potential of a stevedoring company is considered in this research. It is proposed to extend the current field of using the project potential as an estimate of the enterprise technological maturity level in terms of implementing the project management methodology, and applying it as characteristic features of the successful implementation of a specific project. Such an approach involves a two-level representation of the project potential: at the enterprise level and at the project level. In this context, a methodological approach is developed to assess the project potential of stevedoring companies. This approach involves the calculation of the project potential as an integral value, the attributes of which characterize the company's image, quantitative supply of resources, qualitative characteristics of resources and availability of involved resources. The potential project assessment can be used in practice in the selection of promising projects as one of the limiting conditions or as a criterion, complementing the traditional effectiveness indexes.

Keywords: project potential, management, assessment, stevedoring company, selection, resources, image, quality

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RISKS OF TRANSPORT MAINTENANCE OF FOREIGN TRADE DELIVERY (p. 54-59)

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The problem of organizing the transport maintenance of foreign trade delivery should be considered at two levels – strategic and operating, each of them is associated with solving specific tasks, and taking into account relevant risks in planning processes.

As a result of the studies, based on a system approach transportation risks of an exporter (importer), at the level of preparing preliminary decisions on deliveries were identified. Two subsystems of the transport risk system component were singled out: risks associated with traffic capacity and transport performance; risks associated with changes in the transport market condition.

The risk factors for different bases of delivery and terms of using marine vessels (privately-owned vessels or chartered under the terms of voyage charter or time charter) were characterized for the marine component in transport maintenance.

Keywords: foreign trade delivery, risk, transport maintenance, marine transport, transport system, charter

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