

Section I

**Informatics, management systems,
telecommunications and radiolocation**

Barkalov K.A., Getmanskaya A.A., Israphilov R.A.

Application of the adaptive dimensionality reduction scheme to problems of multiextremal optimization with nonlinear constraints

Key words: *multiextremal problems, global optimum, nonlinear constraints, nested optimization, index method.*

A new method for solving the multidimensional multiextremal optimization problems with complicated nonlinear constraints is proposed. The algorithm is based on the adaptive scheme of reducing a multidimensional problem to a system of problems with lesser dimension combined with the index method for the constraint satisfaction which unlike the penalty function method does not require any coefficient adjustment and computation of all the constraints. A general scheme of the algorithm is described. Results of simulation experiments demonstrating the efficiency of the algorithm proposed are given.

Gordyaskina T.V., Grosheva L.S.

Implementation of a synchronous detector with the use of the signal processor TMS320C5510

Keywords: *digital radio signal, digital detection, signal processor.*

The authors carry out an analysis of digital radio signals detection by a synchronous detector, with the use of a signal processor TMS320C5510.

Proidakova E.V., Rybakova A.A.

Traffic control adaptive system with queue passing algorithm

Keywords: *control adaptive system, queue passing algorithm, cyclic control system, imitating simulation.*

The article deals with the adaptive control system of conflicting traffic flows based on the algorithm of passing queues. The study is carried out analytically, as well as numerically, by means of the simulation method, the problem of optimization of the considered adaptive algorithm is also solved.

Section II

**Shipbuilding, ship repair, and ecological
safety of the ship**

Luchkov I.N.

The concept of sheet bending machine with NC of new generation

Key words: *hull processing shop; sheets bending; sheet bending equipment.*

The article suggests the concept of a fundamentally new sheet-bending equipment for the procurement departments of shipyards. Its scheme and description are given.

Ryzhov D.V., Burmistrov E.G.

Development of methods for splicing ship superblocks afloat

Keywords: *superblocks, formation of the hull afloat*

Features of docking of large blocks of vessels hulls after separate launching into water are considered. A new method of docking the superblocks afloat is being developed.

Filippova A.I., Lyapina N.Sh.

The estimation of the share of wood-based materials from the displacement of empty vessel⁴⁸

Key words: *vessel, wood materials, mass share, displacement of empty vessel, dependence, waste.*

In the article the questions of the development of methodology of determining the share of wood in the ship composition. The collection of information data on the projects of various categories ships was carried out. A statistical study of the amount of wood in the hull and superstructure is made. The dependence of the share of wood-based materials from the displacement of the empty vessel is defined.

Cherepkova E.A., Kshaltniy N.I.

The use of renewable energy sources in the shipbuilding industry

Keywords: *alternative energy sources, sailing ships, wind generator, rotary ships, solar panels.*

The use of the alternative renewable energy sources in the shipbuilding industry is considered. The foreign experience of the use of ships using the wind and sun forces is given. The types of solar panels are given.

Section III

Financial and accounting-analytical problems of the modern economy

Domnina O.L., Ovchenkova S.E.

The VHD insurance market development analysis

Keywords: *regional insurance market, Volga Federal district, insurance*

The article presents the regional insurance market state analysis on the example of Volga Federal District. The main Russian Federation insurance market development tendencies and peculiarities are shown.

Kraynova O.S., Sukhanova O.A.

The commercial property market in the service sector's economy analytical review: a regional perspective

Keywords: *rent, premises vacancy, the objects profitability, real estate investment, commercial property, industrial property, demand for property.*

The authors' regional economy state estimation through the prism of commercial real estate renting and selling market condition is common in the world and demonstrates the close correlation between the activity indicators in the market and the business return rates as well as the enterprises profitability, jobs expansion, etc. In the article it is shown that the real estate objects occupy a special place in any economic system considering the rented office premises average rates, the growth dynamics or rental rates reduction. Thus, one can judge about the region general economic state and the corresponding real estate development projects investment feasibility.

Section IV

Economics, logistics and transport management

Abdulatipov M.A., Ivanov V.M.

Economic-mathematical model of current planning of icebreaking conductings in the sea basin

Key words: *model, current planning, icebreaking conducting, caravan, optimization.*

The article presents the economic-mathematical model of the current planning of icebreaking conductings in the sea basin and shows its working capacity on an example. The results of calculations for various objective functions are given, generality and differences in the plans of ice conductings by optimization of economic and technological criteria are marked out.

Bryzgalov A.V., Urtminceev Y.N.

Modern forms of organization of work of the river fleet

Keywords: *river transportation, organization of the fleet operation, forms of navigation*

The work is devoted to the analysis of modern forms of transportations and navigation in inland water transport. The changes in the conditions for the implementation of river transportations and ways of adapting to them at the turn of the twentieth and twenty-first centuries are shown.

Zhmachinskiy V.I., Xiangyu Wu

Prospects for the development of Russian-Chinese trade cooperation in the system of transport corridors (TC)

Key words: *transport corridor, trade turnover, development strategy, Eurasian Economic Union (EAEU), Shanghai Cooperation Organization (SCO), competitiveness.*

There is a task to strengthen economic cooperation with the countries of the Asia-Pacific region and «first of all» with China. It is a strategy of socio-economic development of Russia for the period up to 2020. To solve this problem, the authors of the article analyzed and evaluated alternative options for the development of transport communications in the East-West-East corridor system. The prospects for the development of existing land and sea transport highways (Transsib, BAM, South Sea Route), as well as the routes of the New Silk Road (NSR) and the Northern Sea Route (NSR) are considered. As a result, a conclusion is made about the prospects for the development of the Northern Sea Route (NSR).

Mordovchenkov N.V., Poljakov V.M.

Experience of development and improvement of certification in Germany: infrastructure aspect

Keywords: *accreditation, acronym, convention, competitiveness, control, logo, marketing, international organization, international market, management, modification, German culture, trademark protection, products, certification, syndication, standardization, technological audit, product, service, philosophy of thinking, expert, quality examination.*

At the present stage of development of innovative economy the need for integration processes is conditioned by the fulfillment of the international quality system requiremen. The aim of the work is to study the experience and the process of improving certification in Germany in solving global and priority infrastructure problems. Based on the analysis of the information resource on the status of the certification level in Germany, the Internet resource was used along with traditional methods (analysis, synthesis, generalization); the method of efficiency, the method of comparison and the integrated systems approach are used in the work. The work reveals the significant role of the state in increasing the importance of certification measures, increasing the efficiency and quality of the institution of standardization in the institutional economy at the meso level. The didactic list of components included in the necessary «pool» of competitive certification is expanded: marketing, management (MBA), technological audit and strategic controlling, engineering and reengineering, human (intellectual) capital. Using this approach, there is a syndicate effect, the productivity of equipment, labor and the quality of life of citizens in the context of globalization and state regulation of the technological economy and the transformation of intellectual infrastructure at the meso level is increasing. The experience of forming a certification strategy in Germany allows us to form the domestic vector of the certification and standardization institute in terms of improving the quality of goods, works, services, and increased attention to training highly qualified specialists in the field of solving infrastructure problems using the certification and standardization resource.

Platov A.Y., Platov J.I.

The modern methods of business planning of river fleet

Keywords: *planning of fleet operating, calculation of fuel consumption, fleet requirements, operating costs*

This article proposes a method for determining the requirements for the fleet, as well as operating costs for the transport of goods, taking into account the conditions of navigation and technical parameters of ships. It is shown that simple methods are used at the present moment for practice can lead to significant errors.

Telegin A.I., Frolova E.V.

Analysis of standardity of the river sands obtained and supplied by the Volga ports

Keywords: *river ports, nonmetallic construction materials.*

The quality parameters of the river sand produced by the Volga ports regulated by the industry TU-212 and construction GOST 8736 are compared. The conclusions about the inconsistency of the river sands produced by the ports to the requirements of construction organizations are drawn and recommendations on improving their quality are made.

Tsverov V.V., Zazorina K.I.

Scientific and methodical approach to the choice of motor vehicles in operational conditions

Keywords: *vehicle, operational conditions, the method of choice.*

The article substantiates methodological approach to the adoption of the operational conditions of the decisions on choice of vehicle (type, model) of transportation, transportation and logistic services of transport organizations.

Section V

Operation of water transport, navigation and safety of navigation

Anosov N.M., Malikova T.E., Strelkov A.Yu.,

Bunch-of-packages method for loading sawn timber on deck

Key words: *technology, packaged goods, shifting control, operational safety, sea transportation*

A new solution to the problem of providing for a reliable and safe securing the goods inside a package when shipped by sea has been proposed, and also a problem of package shifting against each other during slinging and lifting on deck operations has been solved. Some drawbacks when carrying out such operations have been found out. The proposed securing design would allow for forming larger unit loads made of four packages thus solving the problem of package shifting against each other when carrying out slinging and lifting goods on deck operations, reducing the time consumed by cargo operations in port.

Lobanov V.A.

Modeling of ship propellers in CAD and CAE systems

Keywords: *propeller complex, propeller, CAD-system, CAE-system, finite element modeling.*

The approach to accelerated modeling of blade geometry of propellers is suggested in the article. With the use of the MATHCAD-medium, a technique has been developed for the formation of a helical surface and a blade contour of any complexity. The procedure of exporting data to the CAE system of the subsequent construction of a three-dimensional propeller model and realization of a numerical experiment is worked out.

Sinitsin M.G.

Method of substantiation of the rational system of organizing the delivery of goods to small rivers

Keywords: *the system, the system of organizing the delivery of goods to small rivers, small rivers, side rivers, berthing facilities, reloading machinery, equipment and warehouses.*

The model of organization of cargo delivery to small rivers is considered in the article. The scheme of interaction of elements of a water transport system of cargo delivery is also made. The relevance of this system in modern conditions is stated. The scheme of development and adoption of decisions on the justification of the system of organizing the delivery of goods to small rivers is developed.

Section VI

Operation of ship power equipment

Epikhin A.I.

The review of modern methods of automatic control of ship power plants

Keywords: *fuzzy logic, feedback, PI-controller, ship boiler, control theory.*

Methods of regulating the supply of boilers in a ship power plant are considered in detail. The distinctive properties of single-pulse, two-pulse and three-pulse regulators are applied to the power control of the main boilers. Explanations are given on the principles of regulation of auxiliary boilers. In order to optimize the system, a fuzzy logic controller is introduced instead of the traditional PI controller .

Solovev A.V.

Diagnostics and prediction of the technical state of the facilities of the ship power plant

Key words: *computer model, technical diagnostics, system analysis, technical state prediction*

This paper proposes a computer model of the diagnostics of the technical state of the facilities of the ship power plant (SPP), obtained by the method of system synthesis. Developed computer model of the diagnostics allows to get a numeric assessment of the technical state of the facilities of SPP and SPP in general, to establish the technical state of the appropriate facility of SPP, and to analyze the dynamics of the changes of the state of these facilities in time to identify the prerequisites and conditions, because of which potential failure can occur. For the implementation in the model the functions of the diagnostics and prediction of the technical state of the block-schemes of the corresponding algorithms have been developed. Algorithm of the diagnostics allowing to determine the state of «go-no-go» with indication of the improper facility and its parameters is an essential means of the River Register expert in the inspection of vessels. For the prediction the algorithm allowing to calculate the time of reaching the technical state of the defective facility is presented, which is of great practical importance as it will allow to determine the optimal timing of maintenance and repair of the facilities of the SPP.

It is shown that a computer model of diagnostics allows to monitor the current processes in the subsystems of the facilities aiming to obtain the anticipatory information about possible deviation indicators of the processes from the given values because of the failure in some subsystem.

Schuraev O.P., Chichurin A.G., Belov N.Yu.

Testing of the engine 6L275 RrII/PN type at idle

Keywords: *tests of diesel engines, screw characteristic, a loading device, the working process of a diesel engine, indicated diagram, harmful emissions with the exhaust gases*

The results of the testing of the internal-combustion engine 6L275 RrII/PN without load holding on the stand in the laboratory have been presented. The purpose of the testing was to check the technical state of the internal combustion engine and the measuring equipment. While testing we obtained the indicated diagrams of the working process in each cylinder and the data on the emissions of the harmful substances in the exhaust gases. According to the testing results the mechanical efficiency of the internal-combustion engine has been estimated and the adjustment of the engine with the subsequent repeated control has been conducted.