

## **Section I**

### **Waterways, ports and hydraulic engineering constructions**

**Sazonov A.A., Voronina J.E.**

The research results of large ships carrying capacity increase possibilities at a section of Tchaikovsky canal-lock – Kambarka by improving river flow cascade regulation on Votkinsk and Kamsk hydroelectric power plants

Keywords: *flow regulation, reservoirs cascade, downstream pool, Votkinsk hydroelectric power station.*

*The authors analyze current state of the site Tchaikovsky canal-lock – Kambarka and provide the results of research dealt with improving its carrying capacity by the regulation of the flow through a cascade of Kamsk and Votkinsk reservoirs. Other possible solutions to this issue are also listed in the article.*

**Sitnov A.N., Kochkurova N.V., Miltsin D.A.**

Justification of water balances parameters provision and of Nizhny Novgorod low-pressure hydroelectric power plant reservoir operation mode

Keywords: *the mode of reservoir operation, indicators of water management calculations.*

*The article presents the results of basic water-related indicators availability calculations in the area of Nizhny Novgorod low-pressure hydroelectric power plant reservoir in its current state and future prospects, as well as dispatching schedules of reservoir operation under different conditions of water availability.*

## **Section II**

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

**Bichik A.V., Egorov O.M., Zhylina S.B.**

Development of structure algorithm for versatile postprocessor to create control program for analogous numerical control systems

Key words: *versatile, postprocessor, Fanuc, iTHC530, CAM, CNC system*

*The article considers the problem of using original features in generating control programs for different numerical control systems (CNC) in machining, presents the algorithm of versatile post-processor and considers approaches to versatility. To verify the implementation of assigned conditions, analysis of the existing solutions is presented. Algorithm of generating versatile post-processor, allowing to apply the unified project for machining process on different CNC-machines is proposed. Implementation of described algorithms is performed in VC++ by development of post-processor on the basis of a project for machining process to generate proper control programs for different frames Fanuc 0/16/18/32, Arumatik, iTHc530, supporting original functional.*

**Kocheganov V.M., Zorin A.V.**

Sufficient condition of low-priority queue stationary distribution existence in a tandem of queuing systems

Keywords: *stationary distribution, control systems, cyclic algorithm with prolongations, conflicting flows, multidimensional denumerable Markov chain*

*The article considers the mathematical model of the tandem queuing systems in the form of a denumerable multidimensional Markov chain. Each service system has two conflicting input flows. In the first system, the customers are serviced in the class of cyclic algorithms. The serviced customers of the first system not instantaneously are transferred to the second system and have high priority. In the second system customers are serviced in the class of cyclic algorithms with prolongations: low-priority customers are serviced when their number exceeds a threshold. In this paper we found sufficient condition of low-priority queue stationary distribution existence.*

**Malov A.S., Pluyshchaev V.I., Spitsina Yu.V.**

Experimental verification of the split satellite navigation receivers usage possibility for determining of the ship traffic parameters

Key words: *satellite navigation, the ship's course, positioning errors.*

*In this article we demonstrate the results of experimental research of errors in the ship coordinates determining, made by navigation receivers under the conditions of artificial sky «shadowing» while passing under bridges, locking, moving along the high bank, etc. We have estimated the course determining error of two satellite navigation receivers installed in the vessel center line.*

**Mitroshina A.S., Pudov A.S., Fedosenko Yu.S.**

The synthesis of service policies of objects flow in the system with refillable storage element

Keywords: *dynamic programming, multi-objective optimization, scheduling theory, NP-hardness, Pareto efficiency.*

*This paper describes the problem that appears in research that aims at implementing a fuel management system for inhabitants of the Northern Territories who are interesting in bulk water-transport delivery. The mathematical model of a logical scheme is constructing in form of uniprocessor system with refillable storage element that carries out single-stage service of deterministic objects flow. We formulate the task scheduling optimization problem in the form where service policies are estimates by two independent minimized criteria. Because of our research, we also provide synthesis algorithm of Pareto-efficient service policies that utilizes bicriteria approach of dynamic programming. The feasibility of the algorithm is demonstrated by numerous examples and results derived from computational experiments.*

**Neumark E.A.**

Improving the quality of genetic algorithm initial population for the traveling salesman problem

Keywords: *traveling salesman problem, genetic algorithms, greedy algorithms.*

*This article discusses the use of greedy algorithms for improving the quality of the initial population of the genetic algorithm for solving the traveling salesman problem. It has been shown that the quality of the initial population wagging on the quality of the genetic algorithm as a whole solution.*

**Proidakova E.V.**

The system with a fixed rhythm and inconstant intensity of service

Keywords: *inconstant intensity of service, cyclic control system, conflicting input flows, computer simulation.*

*This paper studies the impact of inconstant intensity of service on the characteristics of the cyclic control system functioning. The research is carried out analytically and numerically using computer simulation.*

**Trukhina M.A.**

Service schedule synthesis for the packet stream of identical objects

Keywords: *scheduling theory, optimality, finite deterministic flow of objects, branch and bound algorithm, dynamic programming*

*The article considers the model of a single-stage servicing by stationary processor of deterministic stream of objects coming in packets. The packet is considered to be served if service is completed for all of its constituent objects. Each packet has an associated linear penalty function from the moment of its service completion. All the objects that make up the package are considered to be identical. The author sets the problems of service schedule synthesis, constructs solving algorithms based on dynamic programming and branch and bound ideology. Sample implementations of solving algorithms are offered.*

## **Section III**

### **Reliability and resource in transport engineering**

**Yablokov A.S., Cherepkova E.A., Zozulya E.Y., Smallnov A.Yu.**

Calculation console for testing of ship wastewater treatment

Keywords: *frame, bars, load, displacement, voltage, bolted connection, the plate.*

*See the console for testing of ship wastewater treatment in the program APM.WinMachine.*

## **Section IV**

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

#### **Galochkin D.A.**

The role of the classification society in pre-production in Russian shipyards

Keywords: *domestic (Russian) civil shipbuilding, technical pre-production, classification societies, Russian River Register.*

*The article touches upon the issues connecting with improving technical pre-production in Russian shipyard industry. It is substantiated in details the advisability of Russian River Register taking part in the main stages of pre-production in technical supervision over shipbuilding.*

#### **Girin S.N., Frolov A.M.**

Taking into account the influence of the wave vibration inland navigation vessels in the calculation of the additional wave bending moment

Key words: *the hull of an inland vessel, the bending moment, the swell, the wave vibration, the Rules of the River Register*

*The analysis of the requirements stated in Rules of the River Register for calculation of the additional wave bending moment of inland vessels is provided in this article. It is shown that the coefficient in a formula of the Rules considering influence of wave vibration is calculated insufficiently correctly. The recommendations about specification of calculation of this coefficient are made.*

#### **Zyablov O.K., Kochnev Y.A.**

The development of typical engineering models of the ships' repairing technology

Key words: *fault detection, the stretching, the plating, typical engineering processes, typical generalized models, technology, electronic pattern.*

*This article touches upon the use of modern computer technologies in ship repair can significantly reduce the time for development of technological documentation, to improve the quality of work performed, and reduce the selling cost of the repair. The proposed typical generalized models of technology of repair implemented in the structure of MS Excel describe typical engineering processes of repair of major defects of hull structures. They also contain the database of the recommended means of technological equipment and composition of production workers.*

#### **Karpov P.P., Kitaev M.V., Surov O.E.**

Methods for reducing the wave bending moments in the redistribution of ship loading

Keywords: *strength, wave bending moments, kinematics parameters, ship's hull, pitching, standard deviations, optimization*

*The article presents the method of receiving ballast and (or) the vessel's loading for decreasing of wave bending moment during the swell. The systematic calculations of the influence of the vessel's loading effect on kinematic characteristics of pitching and wave bending moments on irregular waves with nonlinear formulation are carried out. The researchers are made for various forms of the hull. The authors suggest the way of redistribution of ballast and (or) the vessel's loading, reducing the wave bending moments. The conclusions about the effectiveness of the method of ballasting are made.*

#### **Lyubimov V.I.**

The design features of the airplanes by A.N. Panchenkov

Key words: *airplanes, aerodynamics, flight, design, testing.*

*The article describes the stages of development, design features and testing results of wig series ADP, created under the guidance of Professor A.N. Panchenkov.*

#### **Cheban E.Yu.**

The Particulars of organization of work for preventing and elimination of oil spill on river's basin level organization

Key words: *oil spill, inland waterways, oil spill removal operation, the regulating support legal system regulating organizational and financial issues concerning oil spills prevention and response.*

*The article touches upon the issue of particular regulating support of work organization for preventing and elimination of oil spill in inland waterways of the Russian Federation. The necessity of detailed location-specific branch documents for oil spills and further changes of the legislation concerning the conditions of inner shipping is proved.*

## **Section V**

### **Financial and accounting-analytical problems of the modern economy**

**Kraynova V.V., Kazakova E.S.**

The improving of internal control over the expenditure of material assets on fleet

Keywords: *internal control, inventory holdings, fuels and lubricants, inspections, monitoring.*

*The article deals with the problem of internal control over the expenditure of wealth on board the ships. The experience of organizing control of fuel costs and navigation material in shipping companies is given and suggestions for improvement are made.*

**Salmin P.S., Salmina N.A.**

The method of analysis of productivity of high school teachers

Key words: *productivity, time distribution, topic and discipline, the significance coefficients of the discipline, an integral indicator of the complexity of the discipline, remuneration of the teacher.*

*The article considers the problem of determining productivity in the field of education. The article aims to evaluate the effectiveness of creative work. The accuracy of expert evaluations of employee education and the manufactured product is ensured by the measuring procedures (the calculation of the significance of the topic (discipline), the integral indicator of the complexity of the subject (discipline)). It is further proposed a method of calculating the amount of credits allocated to the discipline and the total number of hours attributable to this discipline.*

**Telegus A.V.**

The concept of «tax resident of the Russian Federation» for the persons sailing under the state flag of Russian Federation

Keywords: *the tax to incomes of physical persons, tax resident of the Russian Federation, tax deductions*

*Members of crew of vessels sailing under the State flag of the Russian Federation receive income from employment that are taxed at the rate established in section 3 of article 224 of the tax code at the rate of 13%. The article critically analyzes the possibility of recognition of the specified persons tax residents of the Russian Federation and obtaining tax deductions under the tax to incomes of physical persons.*

## **Section VI**

### **Economics, logistics and transport management**

**Dvornikova E.N.**

A comparative analysis of licensing certain types of activities in water transport in the United States and the Russian Federation

Key words: *license, licensing, types of activities, water transport, the USA.*

*The article considers foreign and Russian experience of licensing certain types of activities in water transport. On the basis of the analysis the author revealed similarities and differences in establishment a permitting procedure of certain activities in this industry.*

**Zhendareva E.S.**

River companies of Western Siberia as production and transport complexes

Key words: *river transport, transport infrastructure, non-metallic building materials, mining, production and transport complex.*

*The article describes a comprehensive assessment of the economic efficiency of the production and transport processes in the complex for extraction and delivery of non-metallic building materials to consumers. The risk factors and specifics of economic activity of enterprises were taken into account.*

**Kozhukhar' V.V., Sergeeva T.S., Volkova N.I., Panichev A.V.**

Formulation of problems with transport service in the Far East regions

Key words: *the Far Eastern Federal district (FEFD), integrated economic-mathematical model (IEMM), model parameters, transport geography, resource map, transport-economic balance, development, productive forces, problems, model formulation and solution.*

*In the article the problems of productive forces development in the FEFD are posed. The authors formulated and developed the IEMM parameters: transport geography, resource map, transport-economic balance. The necessity of creation a uniform methodology of calculating full costs of transport services for IEMM is proved.*

**Koryev V.J.**

Formalization of empirical approach to tanker destinations selection under operative regulation of fleet work

Key words: *decisions making, ship destinations, operative regulation, fleet work, expert estimations method.*

*The article is devoted to the development of the formalized empirical method of selecting ship destinations for tanker fleet on the operative regulation stage. The main factors influencing the process of ship destinations selection are listed. The author gives an example of solving a typical selecting destinations task.*

**Kuzmichev I.K., Kornev A.B., Malyshkin A.G.**

The tasks of scientific researches in the field of passenger transportations on river transport

Key words: *social and commercial passenger transportation, shipping companies, passenger ships, passenger traffic, regional programs of passenger transportation development, travel safety, price affordability, passengers' convenience.*

*The article considers the social, economic, technical and scientific problems of development of passenger transportation by river transport. The causes of social passenger transportation losses are covered. The authors offer young scientists, undergraduates and students the scientific research subjects in the field of increasing the efficiency of river passenger transportation.*

**Kuzmichev S.V., Mordovchenkov N.V., Sirotkin A.A.**

Formation and development of the personnel competence in the railway segment of the forwarding industry

Key words: *personnel, training, advanced training, program, competence, forwarding industry.*

*In the article the modern theory and practice of organizational and methodical work on forming and development of the personnel competence in the railway segment of the forwarding industry are provided. Participation of high schools and railway industry companies in training and development of the personnel competence in the stated segment is considered. The authors developed the schemes structuring work on forming and development of the competence in the sphere of forwarding servicing.*

**Mordovchenkov N.V., Novikova T.E.**

Convergence of global and regional economy in the conditions of market: infrastructural aspect

Key words: *convergence, integration, globalization, market infrastructure, controlling, transport services market.*

*The article considers the issues of market infrastructure development in the conditions of the government regulation of economy and management. The authors present the model of the regional and world economy convergence in view of the world market system globalization.*

**Nikitin A.A., Kostrov V.N., Kostrov S.V.**

Modeling of organizational and economic interaction of the elements of port infrastructure in combined transportation

Key words: *interaction, infrastructure, port, combined transportation*

*The article considers the management aspect of the system significant in the organizational-economic interaction at all levels of the cargo handling life cycle in a river port during the combined transportation performance.*

**Nichiporouk A.O.**

Experience and problems of creation of transport and logistic systems of cargo delivery

Keywords: *freight transportation, transport and logistic systems.*

*The structure and elements of logistic systems, experience and features of their creation on transport are considered. The concept is formulated and the structural composition is offered, tasks and the directions of researches in the field of development of methodical quality assurance and efficiency of functioning of transport and logistic systems are designated.*

**Pakhomova E.A.**

The influence of the shadow economy and quasi-market institutions on the development of the post-soviet society

Key words: *institutions, cronyism, communal property, the Soviet period.*

*The article is devoted to cronyism as a social institution. The causes of its emergence and rooting in the Soviet period were identified. The authors analyze the negative features of the cronyism influence on the development of bourgeois relations in Russia in the post-Soviet period.*

## **Section VII**

### **Operation of water transport, navigation and safety of navigation**

**Lobanov V.A.**

Braking characteristics of the propulsion complex «propeller-wheel» when in ice

Key words: *ship, propulsion system, propulsion complex «propeller-rudder», propulsion and steering complex, braking force, ice quality, ice conditions, CAE-systems, finite-element modeling.*

*With the application of the CAE-systems the reversing mode of the propulsion complex «propeller-rudder» has been researched in conditions of pure-water, ice cakes, and small ice cake of various depths and concentrations. Quantitative assessments of pure hydrodynamic resistance and ice loads have been conducted. The curves of the braking force have been obtained in the given ice conditions. Quality features of the character and ratio of the braking force of the complex in ice and in pure-water conditions have been deduced.*

**Puzankov R.A., Klement'ev A.N.**

Azimuth thruster device as a mean of increasing ship's manoeuvrability

Keywords: *azimuth thruster device, ASD, point of water resistance, Shottel, hull interaction*

*The basic analysis of forces on azimuth thruster devices (ASD) is given in the article. It's stated, that previous researches of effectiveness of ASD operations don't take into account hull-thruster and thruster-thruster interaction to the full extent. That necessitates further research in that field, such as development of calculation methods of the forces influence for effective maneuver choice.*

**Tokarev P.N.**

Method of determining hydrodynamic efforts on the ship's propulsion complex

Keywords: *vessel, ship propulsion and steering complex, stress, useful thrust, torque, pace screws, suction rate, engine power, forces on the steering wheel, forces on the rotary nozzle.*

*The article presents the research of influence of engine operating mode and speed on the forces arising in the steering gear of a vessel. Having scanned numerous expressions and using the materials of the previous researches carried out by different authors, we developed a method for determining forces generated by propulsion gear of a vessel. These expressions allow using a computer to conduct a continuous calculation of useful thrust and lateral component of the normal force on the rudder and the rotary nozzle in the range of the full speed of a vessel from zero to nominal full speed, taking into account changes in the operating mode of propulsion from the mooring to the sea speed.*

## **Section VIII**

### **Operation of ship power equipment**

**Korobko G.I., Lebedev V.V., Ahlestin P.V.**

## Simulation of ship's electric power system with active compensator harmonic distortion

*Keywords: ship power system, an active compensator voltage nonlinear distortion, a 12-pulse converter, the most responsible consumers.*

*The article discusses the modeling of ship power system and the impact on it of powerful non-linear consumers. The active compensator is used to improve power quality, on the basis of booster devices to connect consumer data. The comparison is made on the influence of THD voltage, when 12-pulse and 6-pulse converter used in SPS.*

## **Soloviev A.V., Bazhan P.I., Golubev I.V.**

### Energy efficiency of ships

*Key words: energy efficiency of ships, examination, criteria, ship's power plant handling, ship's survey*

*The article dwells on the model concept of target-oriented automatic handling of ship's power plant. Some issues of energy efficiency of ships are considered. Methods of defining ships' efficiency after start-up are stated, being aimed at implementation on the computer-designed model of target-oriented automatic handling of ship's power plant at first examination.*

## **Shurayev O.P., Bevza D.I., Valiulin S.N.**

### The results of numerical modeling of gas dynamics in the ducts of a compact exhaust boiler

*Keywords: temperature field, velocity field, numerical modeling, exhaust boiler, gas dynamics losses*

*The continuation of the analysis of the numerical modeling results of gas dynamics in the ducts of the compact exhaust boiler is set out in the article. The instruments of solution visualization are applied on a larger scale: the temperature fields are designed on new platforms; the graphs of the speed, temperature and pressure changing along the exhaust boiler's relevant directions are given.*

## **Section IX Philosophy. Society. Culture**

### **Bogdanov D.V.**

#### Historical formation and evolution of social networks

*Key words: social networks, the Internet, users, communication, information, relations*

*The article takes a look at the evolution of social networks and the Internet. The structure of virtual relations and features of socio-communicative activities are brought into focus. The basics of the Internet functioning and its impact on modern society are shown.*

### **Vladimirov A.A.**

#### The basic paradigms of the human history

*Key words: paradigm, civilization, culture, stratum, history, mankind*

*The article highlights the problem of existing at present central concepts of chronology and structuring of the human history, each of them being estimated.*

### **Zelenov L.A.**

#### The problems of philosophy modernization

*Key words: modernization, methodology, worldview, axiology*

*The article dwells on the need for modernization of modern Russian philosophy considering its leading spiritual significance in modernization of the entire society.*

### **Tikhovodova A.V.**

#### The criteria of social progress in the context of global problems

*Key words: social progress, the criteria of social progress, manufacturing method, production forces, productive forces, humanization of society, human being, environmental crisis*

*The article considers the changing of conceptions of social progress in the evolution of socio-philosophical thought. Religious, socialistic, and liberal social model is analyzed as a criterion of social progress. The manufacturing method*

*as a dialectic unity of productive forces and productive relations is characterized in the quality of progress criterion, presented in dialectical materialistic philosophy. The need for formulating general-philosophy criterion of social progress is grounded in terms of environmental crisis which involves human beings as well. The directions of evolution of the human civilization are considered.*