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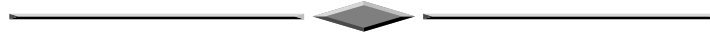
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# GEODESY AND MINE SURVEY



## SPECTRAL-TEMPORAL ANALYSIS OF LASER RANGEFINDER OBSERVATIONS ON THE KAMCHATSKY AND ASHGABAD GEODYNAMIC POLYGONS

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The main goal of the work was to perform a deep statistical analysis of the long-term laser rangefinder observations at two geodynamic polygons located in seismically active regions, but with different kinematics of plate movement. Tectonics of Kamchatka is a subduction zone, Ashgabat is a zone of collision of the Iranian and Turanian plates (advanced the fault of the Kopetdag). All calculations were carried out using programs for processing geophysical data WinABD, which provides a full cycle of operations necessary for working with experimental temporary series. The characteristics and configuration of the laser rangefinder lines are described, the trends are calculated and the average annual displacement rates at these polygons are determined. Periods of superimposed epochs are used to construct periods, as well as a comparison of the results obtained between these polygons.

Considering high seismicity and active geodynamic processes (according to geological data), average annual speed relative deformations on Kamchatka changes in the range from  $8 \cdot 10^{-9}$  to  $5 \cdot 10^{-8}$ , and in Kopetdag from  $4 \cdot 10^{-9}$  to  $3 \cdot 10^{-8}$ .

**Key words:** geodynamic monitoring, laser rangefinder observations, geophysical data processing, subduction, collision zone, kinematics of plates, periodograms, program for temporary series analysis.

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## **EFFECT OF TEMPERATURE ON THE STRAIGHTNESS OF THE AXIS OF THE ROTARY KILN**

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Various methods of alignment rotating aggregates and the conditions for their implementation are considered. The literature sources on this topic are analyzed. It is noted that with the cold alignment of rotating aggregates, it is necessary to take into account the actual temperature of the furnace elements after heating and to correct the position of the furnace axis in height. Various models of thermal deformations arising due to various factors are considered. Examples of production testing methods at cement plants in Russia conducted in 2016-2017 on two octagonal kilns of clinker burning are given. The boundary conditions for performing the correction of the furnace axis after heating have been determined. Recommendations are given on the application of research in industrial enterprises under various conditions. Problems that require further research and reflection in the regulatory documentation are considered.

**Key words:** alignment, modeling, analysis, geodetic measurements, axial straightness, temperature, deformation, correction.

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## **EVALUATION OF INQUISIALLY MEASURED SPATIAL DATA AND THEIR PROPERTIES OBTAINED BY THE METHOD OF PSEUDOONORMAL OPTIMIZATION (CORRELATED VERSION)**

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The article considers the estimation of non-equal-measured spatial geodetic data obtained by the pseudonormal optimization method and their properties for the correlative version of the adjustment. Pseudonormal optimization is fundamentally different from the traditional method of least-squares optimization, since the least-squares method leads to complex and cumbersome procedures for estimating the accuracy of the results of geodetic construction processing due to

complex precision estimation formulas. We note that the direct solution of the conditional communication equations by the pseudonormal solution method has an obvious advantage over the classical method of least squares. This is expressed in the fact that the proposed method eliminates the need to compile and solve normal correlate equations. It is proved that the estimates obtained by the pseudonormal optimization method are unbiased and effective estimates. The proposed algorithm for processing spatial data is implemented using the example of a combined geodetic network.

**Key words:** accuracy estimation, pseudo-optimization, pseudo-inverse matrix, symmetric matrix, idempotent matrix, effective estimation, unbiased estimator, weight matrix, covariance matrix, conditional equations, geodesic quadrangle.

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## THE RELATIVISTIC LAPLACE EQUATION FOR THE PERTURBATION OF THE GRAVITATIONAL POTENTIAL IN THE SPACE-TIME METRIC OF KERR

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The work represents the conclusion of relativistic equation of Laplace for perturbation potential in the space-time Kerr metric. The perturbing potential is the difference between the actual gravitational potential of the Earth's gravity and the normal gravitational potential created by the axisymmetric model of the Earth. In the reference frame rotating with the Earth, the shape and dimensions of the axisymmetric model of the Earth depend on the mass of the Earth, the angular velocity of the Earth's rotation, and the specific angular momentum, normalized to the light speed.

For the derivation of the Laplace equation, the initial expression is the expression for the interval in the Kerr space-time metric for the case of the gravitational field of an axisymmetric rotating body in a reference frame fixed relative to the stars found by R. Kerr in 1963. The covariant and contravariant metric tensors are determined in the work. Using these tensors and the expression for the Laplacian, written in general form, we obtained the Laplace equation in the Kerr space-time metric in the reference frame rotating with the Earth. By expanding the coefficients of the equation in a series, the Laplace equation is represented as the sum of the classical Newtonian Laplace equation and the relativistic corrections to it.

**Key words:** Laplace equation, gravity potential, Kerr space-time metric, gravitational radius of the Earth, relativistic geodesy, general theory of relativity.

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## CARTOGRAPHY AND GEOINFORMATICS



### GEOSPACIAL DISCOURSE OF FORWARD-LOOKING AND BREAKING-THROUGH WAY OF THINKING

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There has been defined the content of geoinformational discourse in forward-looking and breaking-through thinking as a factor providing the leadership in research and development, high rate of obtaining new knowledge and innovative products. The role of scientific and engineering intuition is revealed, the principles of breaking-through thinking in obtaining knowledge in the sphere of geocognitive technologies are formulated. It is shown that breaking-through thinking is realized on the basis of hard- and software systems, providing data collection from heterogeneous sources, data processing and clustering automation, data base formation with distributed data access.

Suggested is the notion of forward-looking thinking system as inseparable set of methodical procedures, logical schemes of analysis and supposed technological solutions, which is not yet realized in scientific research and educational processes and is aimed at the quickest elaboration of new knowledge.

Introduced and determined are: the new term "geocognitive technology", as a particular case of cognitive informative technologies, reflecting the peculiarities of geospatial data use in digital economy; also the new term "agroteomatics" formed by the combination of the known term "geomatics" and the prefix "agro", denoting new cluster, combining methods and data of agro-industrial production and geospatial activity.

Formulated is the principle of forward-looking scientific thinking in geospatial discourse, the essence of which is the transfer of geospatial activity from informational functionality level to analytical functionality level, based on formation of spatial knowledge of territory and intellectualization of innovative geospatial solutions for rational use of all kinds of territorial resources.

It is shown that technical and geotechnological solutions should be complemented by mathematical modelling of limiting factors, the priorities be determined by the hierarchy analysis method of competent experts views. The application of aforementioned thinking types is highlighted by the materials of biological geospatial investigations.

**Key words:** geospatial discourse, breaking-through thinking, geoinformational environment, geocognitive technologies, geocology, biogeocenosis, limiting factors corridor, hierarchy analysis method, coordinated cluster of territory, mathematical model, strategic and static games with nature.

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## AUTOMATIC IDENTIFICATION OF CORRESPONDING POINTS FOR AERIAL IMAGES OF FOREST AREAS

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Identification of corresponding points on the aerospace images is one of the most difficult tasks in data processing of aerial images. Currently a large number of identification algorithms has been developed, one of which being owned by local group is the algorithm of scale-invariant transformations SIFT. The article considers the possibility of applying this algorithm for aerospace images of forests with the purpose to reveal how many reference points will automatically be identified on tree crowns; is it possible to develop a high precision digital model of relief. All the result analysis of the found reference points was performed at different pixel size image. The precision estimation is driven and the conclusion about the further perspective of algorithm SIFT application for determining trees altitudes is made.

**Key words:** aerospace images, scale-invariant transformation, Gaussian function, automatical point identification, forests deciphering, structural algorithms, local algorithms, trees altitude determination.

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## ELEMENTS OF GEOINFORMATION SUPPORT FOR INVENTORY WORKS

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On the territory of rural settlements from 5 to 20 % of real estate objects do not correspond to the description available in state databases. This problem is primarily related to the low level of introduction of modern information technologies in the processes of territorial management of small municipal entities, as well as the lack of geoinformation support for prompt changes in databases from the departments of land and property relations of settlements administrations. As a solution to these problems, a comprehensive use of geoportal and GNSS technologies is proposed. The article gives an expanded description of the elements of the territorial management system, the principles of maintaining a single digital cartographic basis for municipal geographic information systems and

the technological process of preparing cartographic data for publication on the geoportal. The example of rural settlements in the Novosibirsk region shows the functioning of the technological scheme of work on the application of geoinformation support in the inventory of real estate.

**Key words:** geoinformation support, real estate objects, inventory, municipal geoinformation systems, geoportal.

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## **TO THE QUESTION OF CARTOGRAPHICAL PROVIDING THE SOCIAL HUMANITIES**

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The article examines the importance of cartography for the Humanities and social Sciences. Promising direction of development of the Humanities in the digital age. Revealed broad classification of the social Sciences, in communication, what are the specific requirements for the preparation of maps, that is, to cartography-cal semiotics. Dedicated modern the need the social Sciences and Humanities in car-tografichesky provision that gave impetus to the development of cartographic semiotics in the light-those of the Humanities and social Sciences. They noted that cartographic modeling allows you to demonstrate the situation and to respond quickly to changes, Pro outgoing in the study area. Therefore, the card continue to not only actively is-use in many sectors of the economy and society, but also became a geospatial basis for management decisions at all levels. It is concluded that the development of cartographic support of the Humanities and social

Sciences is necessary. create and update a variety of thematic maps that provide clear, relevant information in a wide variety of issues, which is currently the who-penetrate increasingly to the world community.

**Key words:** map, digital maps, thematic maps, cartographic semiotics, cartography in the Humanities, information technology, communication technology, digital humanities.

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## CREATION OF 3D-GEOMORPHOLOGICAL MAP

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The article is devoted to the actual topic of three-dimensional graphics in the field of cartography. 3D modeling helps to visualize objects, which enables the consumer to better interpret coordinated-tied information. The scale correspondence of the coordinate system of the model of the surface and the size of the objects helps to estimate such details that are not available when considering the terrain on a two-dimensional map. The necessity of creating and the importance of geomorphological maps (on the example of the Crimea peninsula) is substantiated in the article. For a better perception of the geomorphological elements, closely interrelated with the relief as a basis, it was decided first to create a 3D model of the relief of the peninsula, and then to apply geomorphological content to it. This article briefly describes the process of mapping: the project created maps showing projection; imported raster map of the Republic of Crimea to the project and made it binding by two points with scaling; added descriptions and graphic representations of new semantics in the classification of layers; completed the digitization of maps on the grid; the project added a dem to the territory of the Republic of Crimea.

**Key words:** relief, geomorphology, 3D-model, thematic content, basis, scale, three-dimensional graphics, geomorphological maps, morphological appearance of the relief.

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## ROUTENAV SOFTWARE FOR NAVIGATION SUPPORT OF AERIAL GEOPHYSICAL WORKS

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In article the navigational complex functional requirements for aerial geophysical works are given. The software RouteNav developed with the participation of the author is considered. The program is used for aerial electro-magnetic complex prospecting works. The main algorithm and features of RouteNav and navigational complex based on it are given.

RouteNav software is used for flyings which need precise routes following with trace error estimation. The program's interface is developed for high-quality and effective resolution of

navigation issues without auxiliary personal in pilots' cabin during the fly or with them minimal participation. RouteNav was successfully passed ground-based and fly tests and it's used in AeroGeophysical surveys CSJC for airborne electro-magnetic geophysical prospecting works.

**Key words:** GNSS, GPS, navigation, aero geophysics, software, route maintenance, trace errors.

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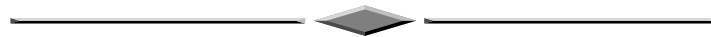
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## LAND MANAGEMENT, CADASTRE AND LAND MONITORING



### IMPROVEMENT OF CADASTRAL WORKS ON SPECIFICATION OF THE BOUNDARIES OF PREVIOUSLY SURVEYED LAND PARCELS

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The article offers cadastral works method in relation to previously surveyed land parcels, directed to specification of their boundaries, which allows to sufficiently reduce labour intensity of field works, to avoid the overlapping of boundaries of the parcel being specified on the ones of the adjacent parcels and to exclude the need for accommodation of parcel borders on field. Besides, in the event of land dispute there appears irrefutable evidence base for both out-of-court and in-court settlement. All this finally allows to reach essential economy of resources in performing cadastral work and significantly reduce the cost of field geodetic measurements. Thereby a very important

social aspects is realized, the essence of which is in the fact that the owners of previously surveyed land parcels are as a rule senior citizens and cadastral cost decrease will allow this population category to meet the requirements of current legislation on land parcel borders alignment, that in its turn will result in information updating in US RIP.

**Key words:** real estate objects, State Cadastre, real estate registration, single database, previously surveyed land parcels, geodetic measurements, cameral and field geodetic work, land parcel borders alignment, land disputes settlement, local and conditional reference system, vector.

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## **IMPROVEMENT OF THE METHODOLOGICAL BASIS OF CADASTRAL VALUATION OF RESIDENTIAL PROPERTY**

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The results of the first round of the state cadastral valuation of real estate revealed the weaknesses of the methodology of state cadastral valuation. To improve the methodological basis, a cadastral valuation methodology based on the principles of individual and mass evaluation was proposed. Within the framework of the experiment, the initial market information was verified, an automated method for calculating the basic indicators of the real estate market (using the example of apartments) was used. A comparative approach is applied using the correction method. In contrast to the classical theory of cadastral valuation, an algorithm for the automated selection of analogue objects was developed within the framework of the study. To take into account the effect on the cadastral value of the location factor, clustering of real estate objects with respect to public transport stops was suggested. As a result of approbation it was revealed that the proposed methodology allows to reduce the error of the evaluation results in comparison with the methodology of the state cadastral valuation.

**Key words:** cadastral valuation of real estate, mass appraisal of real estate, individual evaluation, appraisal of real estate, analogue of real estate, clustering of real estate objects.

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## **ABOUT THE PROBLEM OF TOURISTIC RESOURCE CADASTRE AND ITS MAIN CONTENT**

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The development of the tourism industry in the modern world, including Russia, is proceeding at a rapid pace, contributing to the adequate development of the infrastructure: transport, hotel and restaurant, advertising and information. The latter aspect is one of the most significant and can now be represented by a specialized tourist cadastre (register). Among the most important elements of such a cadastre, along with tourism resources are their indicators, including indicators of safe tourism. The latter aspect requires the identification of hazards and the calculation of safety indicators that determine the insignificant probability of occurrence of dangerous situations for the life and health of the tourist. The variant of the structure of such a cadastre with the elements of the security system is discussed in this article.

**Key words:** tourist resources, tourist industry, infrastructure, cadastre (register), indicators of safe tourism, passport of tourist object, monitoring.

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## OPTICS, OPTICAL AND ELECTRONIC DEVICES AND COMPLEXES



### OPTICAL DESIGN FOR ADJUSTMENT OF TELESCOPIC ZOOM SYSTEMS

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The importance and complexity of the adjustment phase in the design and manufacturing of optical systems with variable magnification is demonstrated. The article describes the limitations and advantages of the existing adjustment methods for zoom systems with two moving components. The article provides the description and outlines disadvantages and advantages of the existing adjustment methods for zoom systems with two moving components. The author's method for adjusting the telescopic devices with optical zoom relay systems is proposed. The actuality of the optical design for creating the alignment process is proved. Article describes the creation of an "Adjustment Calculator" by using free-ware and standard software. The results of the created alignment process for the optical zoom rifle scope are discussed. The conclusion is made about the effect for each moving component of the relay system on the change in the magnification and defocusing zoom system as a whole. The actuality of the selective assembly for zoom rifle scopes is shown. A construction of frame with mounting moving optical lens to simplify the alignment process is proposed.

**Key words:** variable magnification, zoom, optical zoom sight, zoom rifle scope, optical telescopic system, afocal system, optical zoom relay system with two moving components, zoom system, alignment of optical devices, mounting lens, optical design, selective assembly, assembly.

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## CALCULATION OF THE AMPLITUDE OF NATURAL OSCILLATIONS FOR RECTANGULAR AND CIRCULAR MEMBRANES

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A theoretical analysis of mathematical models is made and a calculation of the amplitude of natural oscillations for rectangular and circular membranes with given initial conditions have been carried out. The natural frequencies of oscillations are determined for membrane materials, most often used in so-called films technologies.

The Fourier method allows one to obtain analytic solutions in which the eigenfunctions and eigenvalues of the problem are expressed: in the case of a rectangular membrane through trigonometric functions, and in the case of a circular membrane, through Bessel functions. In both cases, the amplitudes of the natural oscillations are inversely proportional to the natural frequencies and eigenvalues of the problem and decrease with increasing number of standing half-waves, the number of which, under given initial conditions, is always an odd number.

Mathematical models natural oscillations of membranes can be useful to developers of Micro Electromechanical Systems (MEMS), and the solutions obtained can be used to calculate the dynamic parameters of moving elements MEMS.

**Key words:** micro-electromechanical systems, wave equation with given initial and boundary conditions, Fourier method, eigenfunction, eigenvalues, natural frequencies and amplitudes of natural oscillations.

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## ECOLOGY AND ENVIRONMENTAL MANAGEMENT



**THE PATTERNS OF ECOLOGICAL FUNCTIONS DISTRIBUTION  
OF LITHOSPHERE IN THE UPPER OB REGION AS THE BASIS  
OF RATIONAL ENVIRONMENTAL MANAGEMENT**

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The knowledge of the patterns of distribution of ecological functions of the lithosphere has important theoretical and practical significance: for the scientific substantiation of methods of rational development of natural resources, their assessment, prediction of use of territories with different ecological properties, for establishing their ecological and recreational capacity, analysis of ecosystem resilience to anthropogenic impacts, assessing the occurrence of areas of high environmental risk and geodynamic stress. One of the timely methods of solving these problems is a geoenvironmental zoning and for more private questions – ecologo-geological zoning, which is both a frame of ecological and geological cadastre.

**Key words:** ecological functions, lithosphere, environmental management, assessment and prediction of land-use, environmental capacity, environmental risk.

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## **INFLUENCE OF THE GEOPHYSICAL RELIEF ON THE HUMAN BODY AND BODY HEIGHT OF PLANTS**

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Electromagnetic fields surround us everywhere. However in assessment of extent of impact on a human body "water forms" (the architectural term) the existing buildings, constructions and their design decisions, consider insufficiently the electromagnetic fields and radiations of low and ultralow intensity modulated by their forms which are much lower than accepted standards. Researches show a possibility of influence of architectural forms (models in the form of the "Egyptian" pyramid, a tetrahedron commensurable with sizes of the person), on a human body as an essential factor or the operating system alive organisms. Results of the experiments with participation of volunteers made for the purpose of specification of influence of various "fields of forms the" of geometrical arrangements used in the modern construction and architecture on the person showed what the human body which is in models of various geometrical forms in a particular geographical point symmetrically reflects a condition of a geophysical relief, at least, on its electromagnetic component which consequence change of its psychoemotional and physical condition according to the genetic (power informational) memory fixed at it is.

The method of assessment of a condition of a geophysical land relief in the form of its 3D visualization received by means of the express computer program on the basis of assessment of growth rate of vegetable test-objects in field conditions is offered. In general it gives the chance to plan paths of a comprehension and level of influence on the person of a complex of factors of geometrical forms of structures, buildings and constructions, in an optimum combination to degree of irregularity of a geophysical component of a surrounding medium. The concept of "the field of a form" with collimating of physical sense to it and the possible mechanism of their influence on a human body develops.

**Key words:** radiation, form, fields, structure, energy, visualization, relief.

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## **JUSTIFICATION OF THE VALUE OF THE TERRITORY FOR THE CREATION OF THE SOBOT PROTECTED NATURAL TERRITORY OF «BOKEIORD» OF THE WEST-KAZAKHSTAN REGION**

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The article is devoted to the problems of environmental protection in Kazakhstan, where the results of the analysis of the value of the territory of the scientific substantiation of the geoecosystems of the projected state nature reserve "Bokeyorda" of the West Kazakhstan region are given, where the modern ecological state is analyzed, the value of the territory of the state natural reserve for preserving the habitats of rare and endemic species of biodiversity and maps of the investigated territory were compiled. The studies were carried out within the framework of the project of the Government of the Republic of Kazakhstan and the Global Environment Facility. The theoretical and methodological basis of the research consists of general scientific methods: descriptive, comparative, statistical, system analysis, cartographic. The research methodology is based on a system of general principles and approaches. In general, in the investigated territories of the projected state nature reserve "Bokeiorda", the balance in natural complexes is not violated, which allows them to be recommended for the organization of the state natural reserve "Bokeiorda" of the West Kazakhstan region.

**Key words:** state natural reserve, value of territory, geocosystem, flora, fauna, steppe, habitat.

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## **PROBABILISTIC-STATISTICAL AND INFORMATION ASSESSMENT OF CONTEMPORARY PROCESSES IN NATURAL OBJECTS ON THE BASIS OF DATA OF SOIL MONITORING**

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Monitoring researches of soils and other natural objects raise a number of important methodological and methodical problems, including the probabilistic and statistical analysis of data of monitoring and their use for verification of estimates of natural processes. Large-scale and detailed soil researches have shown that, even in homogeneous objects, soils are characterized by essential fluctuations and variation of properties in space. The variability of properties at all levels

of the organization of soil cover is one of fundamental features of a soil because it is an open complex, dynamic and evolving system.

The general theoretical approaches to probabilistic assessment of the contemporary evolution of the soil (CES) according to data of large-scale soil monitoring are given in the article. Assessment of changes of properties of the soil at the level of fields is important for the characteristic of CES that it allows to draw conclusions about the contemporary processes happening in soils caused by anthropogenic influence and climate changes. CES is considered as continuous process of changes of conditions of the soil with time intervals from ten to hundred years.

When carrying out spatial soil monitoring, points of approbation in space at different time intervals don't coincide. Therefore for assessment of states and changes of soils it is necessary to use probabilistic and statistical models. The condition of the soil in the time moment  $t$  is characterized by relevant at this moment variability of  $n$  soil properties in its  $k$  genetic horizons (layers). The characteristic of variability of property is the probabilistic and statistical distribution (PSD) of its values in the territory of the studied object therefore the quantitative model of a condition of the soil represents set of PSD of  $n$  properties of the soil in its  $k$  horizons.

Proceeding from it, we have offered to use probabilistic and statistical and information characteristics (indicators) for assessment of condition of soils and their changes. For condition of the soil, besides the PSD functions of properties of the soil, as the characteristic of state information (statistical) entropy is used. For assessment of changes of soils values of information divergence of properties and an increment of entropy are used. The entered characteristics allow estimating extent of influence for the soil forming factors and anthropogenic impacts on probabilistic structure of values of properties of the soil and its stability.

The case studies have been conducted in the big territory at the south of Western Siberia. It has been shown that CES occurs under the anthropogenic influences and natural processes caused by climatic trend of warming and by cycles on moistening. It is revealed by changes of probabilistic structure of values of properties of the soil. On data of archive records the probabilistic and information assessment of changes of soils in the south of Western Siberia during 60-90 years of the 20th century is executed. In fact, the received models and estimates are statistical standards of condition of soils which should be used for comparison with the current and future results in the explored and neighboring territories.

**Key words:** monitoring; soil properties; data base; probabilistically-statistical models; statistical standard; information entropy and divergence.

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**MATHEMATICAL MODELING OF THE DEPENDENCE OF THE WATER LEVEL IN THE OB RIVER IN NOVOSIBIRSK FROM THE WATER RESET AT THE NOVOSIBIRSK HYDROELECTRIC POWER STATION**

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Recently the amount of dangerous floods caused by the rapid climate change increased significantly. The floods undermine the economies and threaten the security of people. Availability of reservoir makes it possible to regulate the river's flow and prevents flooding. Regulating river's water level is difficult task which depends on many criterions. Part of the solution to this problem is based on statistic data analysis and mathematical modeling.

The article presents the results of the correlation-regression analysis of data on the water level in the Ob river of the Novosibirsk water station and water discharge at the Novosibirsk hydroelectric power station.

**Key words:** water level, water discharge, statistical data analysis, correlation, regression dependence.

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## METHODOLOGY OF SCIENTIFIC AND EDUCATIONAL ACTIVITY



### SCHOLARISM OF THE «NEBULOUS GERMANY»: TO THE COMIC GERMAN SCIENTIST'S IMAGE IN RUSSIAN LITERATURE OF THE LATE XVIII – EARLY XX CENTURIES

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The paper deals with the image of a German scientist as a bookish kind of mind, scholastic and dogmatist, which is presented in Russian literature of the XIX – early XX century. Study materials are works by A. S. Pushkin, D. I. Fonvizin, F. P. Lubyansky, M. P. Pogodin, K. Prutkov, O. Senkovsky, S. Chorny. A degree of comic in the image varies by the authors from humoristic to satiric what corresponds to the general trend of representing a German character in the Russian literature of the affected period. The main elements of this image are pedantry, overconfidence, abstractedness, grotesque ridiculous appearance. By the way the logic of scientific cognition turns within the comic chronotope into its complete antithesis. Thus, it demonstrates the absurdity of the 'speculative' German scientist's behavior and thinking.

**Key words:** Germany, germans, russian literature, imagology, literature character type, scientist's image.

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