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E-mail: vestnik@ssga.ru
Tel. (383)361-06-55
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D. V. Romanov

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LAND MANAGEMENT, CADASTRE AND LAND MONITORING

OPTICS, OPTICAL AND ELECTRONIC DEVICES AND COMPLEXES

ECONOMICS AND MANAGEMENT OF NATIONAL ECONOMY

EDUCATION

METHODOLOGY AND ORGANIZATION OF SCIENTIFIC RESEARCHES

CHRONICLE

APPROXIMATION GRAVITATIONAL INFLUENCE LOCAL RELIEF USING SOME ANALYTICAL MODELS AND FINITE ELEMENT METHOD

Boris T. Mazurov
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: btmazurov@mail.ru

Gravity field definition, it is not trivial to transformant. To solve the combination of analytical descriptions of some elementary spatial solids with finite-element partitioning. Here are some possible practical use of analytical models. Namely, in addition to traditional bitmap representations of mass quality of approximation can be improved using a finite-element boxes and digital elevation models. This method allows more detail to describe the gravitational influence of the local topography.

Key words: gravity, analytical models, finite element.

DEVELOPMENT OF METHODOLOGICAL PROBLEMS OF CREATING SATELLITE MONITORING OF FOREST ECOSYSTEMS UNDER THE IMPACT OIL AND GAS SECTOR OF WEST SIBERIA

Vladimir A. Khamedov
Ugra Research Institute of Information Technologies, 628011, Russia, Khanty-Mansiysk, 151 Mira St., Head of the Center for Space Services, tel. (3467)35-91-39, e-mail: XamedovVA@uriit.ru

Boris T. Mazurov
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: btmazurov@mail.ru

Structure of monitoring system for Ugra forest resources state is developed on the base of geoinformation technologies. Monitoring system involves database on state of forest resources and databases on space images and map data. Digital maps of tree specific composition and fire safety are carried out on the base of space images. General soft ware of monitoring system consist of ArcGIS and ERDAS Imagine. The monitoring system ensures that the works on the monitoring of the environmental condition of the territory of the forest fund on the basis of remote sensing data. To solve the problems of topical application used satellite images of optical and radar ranges. An example of thematic tasks is to detect landscape changes related exposure to both natural and anthropogenic factors, assessment of the impact of oil and gas industry for silvicultural cover.

Key words: geoinformation system, remote monitoring, space images, radar imagery, forest resources, forest ecosystems, oil and gas production.

INFLUENCE OF THE RELATIVISTIC EFFECTS ON THE TRAJECTORY OF ARTIFICIAL EARTH SATELLITES

Aleksandr V. Elagin

Siberian State University of Gesystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assoc. Prof., Department of Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: VG@ssga.ru

Inna E. Dorogova
Siberian State University of Gesystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., senior Lecturer, Department of Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: inna_dorogova@mail.ru

The influence of relativistic effects on the trajectory of the satellites GOCE and GLONASS was estimated on the daily time interval. The size of relativistic effect was estimated by comparing of two trajectories. The trajectories were constructed by numerical integration of Everhart. To construct a first trajectory (orbit of Kepler) was used Newtonian equations of motions, to construct of second trajectory was used relativistic equations of motions. Differences orbits for the satellite GOCE was totaled 2.82 meters on the daily time interval, and differences for GLONASS satellite was totaled 0.35 meters. Experiments showed that relativistic effects have influenced only argument of perigee and mean anomaly. It is concluded that the periodic changes of orbital elements is greater than the secular changes. The inclusion of relativistic effects is needed at the present level of the accurate orbital calculations.

Key words: relativistic equations of motions, orbit of Kepler, space-time Schwarzschild metric, the initial conditions of motion, numerical integration, the Schwarzschild offset of the perigee.

GRAVITATIONAL CORRECTION FOR THE INFLUENCE OF WATER MASSES OF THE INTERMEDIATE LAYER

Yuri V. Dementiev
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D, Prof., Department of Physical Geodesy and Remote Sensing, tel. (913)901-08-71, e-mail: dir.inst.dzp@ssga.ru

Anatoly I. Kalenitsky
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D, Prof., Department of Physical Geodesy and Remote Sensing, tel. (913)906-74-53, e-mail: kaf.astronomy@ssga.ru

Artem V. Mareev
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., a graduate student, Department of Physical Geodesy and Remote Sensing, tel. (953)865-45-78, e-mail: kaf.astronomy@ssga.ru

The influence of intermediate layer water masses of the Earth. Set the value of the gravitational corrections ranges from 0.2 to 0.7 mGal and the vertical gradient of the amendment is close to zero. The maximum horizontal gradient in latitude is about 0.01 mGal per 100 km, therefore, to consider the amendment for water mass is only advisable if the planetary gravitational field research.

Key words: intermediate layer, topographic reduction, gravity correction, digital elevation model.

ONE-DIMENSIONAL SPHERICAL FOURIER TRANSFORMATION AND ITS IMPLEMENTATION FOR THE CALCULATION OF THE GLOBAL MODEL QUASIGEOID WITH ACCURACY OF THE ZERO APPROACH OF MOLODENSKY'S THEORY

Denis N. Goldobin
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., engineer of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Elena M. Mazurova
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., professor of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Vadim F. Kanushin
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., docent of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Irina G. Ganagina
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., the head of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Nikolay S. Kosarev
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., post-graduate student, department of physical geodesy and remote sensing, e-mail: kosarevnsk@yandex.ru

Alexandra M. Kosareva,
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., graduate student of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

At present the method of discrete linear transformations, based on two-dimensional fast algorithms like Fast Fourier Transform (FFT), Fast Hartley Transform (FHT), Fast Wavelet Transform (FWT), and others, is widely used to determine the transformants of the Earth's gravitational field in flat approximation. These algorithms are especially effective if the original information (such as gravity anomaly) is known at the grid points.

The paper presents the results of calculation of the Stokes' integral using 1D spherical FFT technique. In the method presented, the one-dimensional Fourier transform is applied to the kernel of the integral specified and application in the east-west direction, combined with the summation over the parallels. Stokes' kernel presents singularities at the origin. In order to deal with this problem, a value of zero is forced at the origin when we are using FFT, and after the computations are done, the value for the origin has to be restored. For arrays of large-size data, this method requires more computer time than two-dimensional spherical FFT, but it is much faster than point wise integration. Besides, this method allows substitution calculations to be done, which saves considerably the computer memory.

Key words: Fast Fourier Transform (FFT), global quasigeoid, model global quasigeoid of the zero approach.

THE DEFINITION OF GRAVITY POTENTIAL AND HEIGHTS DIFFERENCES IN GEODESY BY GRAVIMETRIC AND SATELLITE MEASUREMENTS

Vadim F. Kanushin
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., docent of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Alexander P. Karpik
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., rector, e-mail: rector@ssga.ru

Denis N. Goldobin
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., engineer of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Irina G. Ganagina
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., the head of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Elena G. Gienko
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., docent of physical geodesy and remote sensing department, e-mail: kaf.astronomy@ssga.ru

Nikolay S. Kosarev
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., post-graduate student, department of physical geodesy and remote sensing, e-mail: kosarevnsk@yandex.ru

The determination of the gravity potential differences required to build a global geoid by high-precision measurements of gravity using modern gravimeters and coordinate definitions by global navigation satellite systems (GNSS) has been done.

The relevance of this work is that the determination of accurate global geoid as equipotential surface of the gravitational potential needed to a common reference surface for establishing the global height system.

The paper presents the results of experiments by definition of potential and heights differences between points in the village Shabalin and on the Seminsky pass in the Altai Mountains, using high-precision measurements of gravity and GNSS measurements. The optimal technique of gravimetric measurements is developed, the working formulas are derived, and the estimation of the influence of measurement errors on the results is produced. It is shown that under the experimental conditions to calculate the potential difference and the heights is enough to use linear expressions (the contribution of the nonlinear components is equal to 0.04% of the total value). Substantiation requirements for gravimetric and GNSS-measurements to control the determination of the difference between potential by the relativistic shift of the quantum oscillators frequency is given.

In addition, testing global models of gravitational field of the Earth EIGEN-6C4 according to geometric levelling and GNSS measurements on the territory of Gorny Altai has been done. The obtained differences of height anomalies, equals 21 cm, corresponds to the estimated accuracy of this model that were made for other areas of the Earth.

Key words: gravity potential, gravimetric survey, GNSS-measurements, geodetic and geometric height, global model of gravitational field of the Earth EIGEN-6C4, relativistic geoid, global system heights.

VERIFICATION OF REMOTE SENSING TO ASSESS THE PETROLEUM POTENTIAL POORLY KNOWN AND UNPROMISING AREAS (FOR EXAMPLE, THE KURGAN REGION)

Andrew Y. Belonosov
West-Siberian affiliate of the Institute of Petroleum Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences, 625026, Russia, Tyumen, 74 Taimyrskaya St., Ph. D., senior researcher, tel. (3452)68-87-92, e-mail: belonosov74313@mail.ru

Anatoly I. Kalenitsky
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Physical Geodesy and Remote Sensing, tel. (383)361-01-59, e-mail: 52tkrbv@rambler.ru

In the Mesozoic sedimentary cover of the hydrocarbon accumulations in the Kurgan region is not detected. The geological concept of prospecting of oil and gas deposits in pre-Jurassic basement is not available, although the prerequisites are. For optimal search strategy of the hydrocarbon accumulations in the Paleozoic basement you must use the methods of remote sensing. Held sensing territory Kurgan region from space remote geothermal method. Thermal anomalies were subjected to terrestrial certification by the method of variation of hydrocarbon shooting. Identified promising forecast area. Recommended conducting further exploration work, including parametric and exploration drilling.

Key words: remote sensing, remote geothermal method, petroleum potential, Paleozoic basement, kern, geochemical anomaly.

APPLICATION OF CARTOGRAPHIC MODELS OF NATURAL RESOURCES AT DIFFERENT STAGES OF ENVIRONMENTAL MANAGEMENT

Olga N. Nikolayeva
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St, Ph. D., Assoc. Prof., Department of Ecology and Environmental Management, tel. (913)744-36-37, e-mail: onixx76@mail.ru

Cartographic model-building for natural resources of certain territories is considered. The reasons for inefficient use of natural resources information in current Russia are presented. The place of natural resources mapping in resources information space formation is shown. The lack of uniform techniques for complex mapping of natural resources is stated. The task of system consideration of natural resources is set, that is necessary for cartographic support of natural resources management. The authors suggest using cartographic models of natural resources for this purpose. Basic principles of cartographic model-building are enumerated. The structure of

modeling system for efficient environmental management is presented. Brief characteristics of main functional types of cartographic model-building are given, which involve inventory, assessment, prediction and recommendation. The features of their application at different stages of environmental management are described.

Key words: efficient nature management, natural resources, natural resources mapping, complex map-making, system mapping, cartographic models.

CARTOGRAPHIC METHOD OF 2-DIMENSION MAP TRANSFORMATION INTO 3 – DIMENSION MAP WITH THE HELP OF GIS-TECHNOLOGY

Nguen An Taj
Architecture University, Vietnam, Hoshimin, 196, PASTEUR st, region 3, Post-graduate SSUGT, teacher, tel. (084)0978643020, e-mail: natai1969@yahoo.com

The article deals with 3 – dimension map creation technology by means of 2D map transformation into 3D map in the environment Mapinfo with added to it package Egage 3D Professional. The developed technology of forming 3D object cartographic images allows to significantly speed up the 3D mapping process. The application of this technology allows to create 3D maps much faster, than creating them all over again on the basis of survey information.

Key words: 3D map, Mapinfo, Engage 3D Professional.

FEATURES OF LAND-MANAGMENT ACTIVITIES UPON THE BORDERS OF SPECIALLY PROTECTED NATURAL TERRITORIES

Aleksey K. Zubenko
Tyumen State University of Oil and gas, 625000, Russia, Tyumen, 38 Volodarskogo St., teacher of special disciplines, tel. (919)951-91-93, e-mail: info@tsksts.ru

Yuri V. Kasatkin
Tyumen State University of Architecture and Civil Engineering, 625000, Russia, 2 Lunacharskogo, assistant lecturer, Department of Geodesy and Photogrammetry, tel. (922)264-45-54, e-mail: tgasa@mail.ru

The article describes the experience of preparation land-management business and the main component of map (plan), necessary for entering information in the state real estate cadaster of the boundaries of specially protected natural territories. The legislation classifies the boundaries of nature reserves to areas with a special regime of use, details of which should be included in the state cadastre of real estate (OCG).

As a protected area selected state natural reserve of regional importance "Pacholski", located on the territory krasnoselkupskii district of Yamalo-Nenets Autonomous district.

In the process of carrying out a range of land management determined phasing of the work, identified the need for additional approval of legal acts that would explicitly regulate the process of preparation and approval of land use cases and entering of data in the OCG about the boundaries of protected areas.

Key words: specially protected territories and objects, the border, territories, wildlife refuge.

SOME PECULIARITIES OF ASSEMBLY AND ALIGNMENT OF LENS OPTICAL SYSTEMS WITH LIQUID COMPONENTS

Igor O. Mikhailov
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assoc. Prof., Department of Nanosystems and Optical Devices, tel. (383)344-29-29, e-mail: mio@sibmail.ru

Sergey M. Churilov
Novosibirsk Branch of the Institute of Semiconductor Physics, Siberian Branch of the Russian Academy of Sciences, «Technological Design Institute of Applied Microelectronics», 630090, Russia, Novosibirsk, 2/1 Lavrentiev avenue, Deputy Branch Director, tel. (383)330-72-40, e-mail: oos@oesd.ru

Viktor B. Shlishevsky
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Nanosystems and Optical Devices, tel. (383)343-91-11, e-mail: kaf.nio@ssga.ru

Some features of the optimal design of miniature optical systems based on liquid lens with a variable focal length are discussed. The principles for their design on the base of liquid lens modules made of materials with similar temperature coefficients of linear expansion (liquids, glass, plastic) is proposed. The principles are illustrated by the example of a simple two-component optical block consisted of a pre-adjusted liquid lens module and a solid lens. The structure diagram for adjustment and control of optical "monoblock" with liquid lens elements is considered. The alignment is carried out by transverse displacement of the lenses, by their tilt and adjustment of the air gap between the components. The examples of structures of complex optical systems with liquid lenses of different ratios between the diameters of the optical components are given. Assembled by the proposed method optical system constructions with liquid lenses have high stability of their optical parameters.

Key words: liquid lens, construction, optical system, variable focal length, radius of curve, assembly, aligning.

PHOTONIC JET WITH BIREFRINGENT EFFECT BASED ON PHOTONIC CRYSTAL

Igor V. Minin
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Metrology and Technology of Optical Production, tel. (383)361-07-45, e-mail: prof.minin@gmail.com

Oleg V. Minin
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Metrology and Technology of Optical Production, tel. (383)361-07-45, e-mail: prof.minin@gmail.com

We have introduced a novel type of photonic crystal aided photonic jet with birefringent properties. Our results suggest novel directions in the study of the intriguing properties of metamaterials and photonic crystals aided photonic jets. Birefringence and photonic crystal aided

properties of considered the optical element due to the effect of local electric fields localizations, which are shown in the propagation of light in a dielectrically inhomogeneous structure. Possible fields of application of the observed effect are discussed.

Key words: photonic jet, birefringent effect.

DEVELOPMENT INSTITUTE OF PUBLIC-PRIVATE PARTNERSHIP IN THE FIELD OF IMPROVING THE QUALITY OF LABOR AND EMPLOYMENT ASSISTANCE

Anna N. Shadrintseva
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assoc. Prof., Department of Management and Entrepreneurship., tel. (383)361-01-24, e-mail: shadan738@gmail.com

The article describes the problem of unemployment and the possibility of public-private partnership in the field of improving the quality of a workforce. An opportunity to attract extra-budgetary sources of funding is highly relevant in terms of economic instability and a lack of budgetary funds for the implementation of social projects and programs. Consequently, the mechanism of interaction of business with educational institutions and the state institutions is very important. At the same time, it is shown effective impact of PPPs on the employment promotion based on a cluster approach. One of the main advantages of the cluster approach in the creation of an innovative economy is a leading role for business.

Key words: public-private partnership, cluster, employment, quality of the workforce.

COMPLEX ESTIMATION OF EFFICIENCY INNOVATION PROJECT

Olga V. Titova
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assoc. Prof., Department of Business-process, tel. (383)210-95-87, e-mail: ovt08@mail.ru

At present, innovation in enterprises is one of the principal means by which the competitiveness of manufactured products, maintain high levels of growth and profitability. The article highlights the importance and characteristics of evaluation of economic efficiency of innovation project in comparison with the investment project. In connection with this understanding and ability to evaluate the cost-effectiveness of the innovative project is of particular relevance. In this work on the basis of a comprehensive methodology for assessing innovation efficiency gives calculations of economic feasibility of the project on introduction of innovative technology. As the object of research is used print, LLC.

Key words: innovation, innovation project, investment project, innovative technology, competitiveness, competitive advantage, performance indicators, evaluation of economic efficiency, cost-effectiveness, production efficiency.

CLIMAT AND ECONOMICS IN THE MODERN STAGE OF WORLDWIDE ECONOMY DEVELOPMENT

Larisa V. Voronina
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Senior Researcher, Assoc. Prof., Department of Management and Entrepreneurship, tel. (383)361-01-24, e-mail: voroninasgga@mail.ru

Anton A. Sergeev
Federal State Institution «Center of laboratory analysis and technical measurements of the Siberian Federal District», 630099, Russia, Novosibirsk, 28 Romanova St., Chief Accountant, tel. (383)362-03-04, e-mail: sergeev_a1985@mail.ru

The analysis of modern climate fluctuations and its impact on economic processes in the background of globalization of the world economy. Given graphical and numerical data to assess the current climate fluctuations and their impact on the economy.

Key words: climate, economy, warming, air temperature, global economy.

ADVANTAGES OF DIGITAL VIDEO IMPLEMENTATION AT THE FOREIGN LANGUAGE LESSONS

Evgeniya V. Dushinina
Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Assoc. Prof., Department of Foreign Language, tel. (383)343-29-33, e-mail: respond2005@yandex.ru

In the article the main advantages of digital video implementation at the foreign language lessons are described: the quality of sound and picture, multiple playback function, small size, usability, universality, memory size, etc. Wide opportunities of on-line services and various USB-drives for teaching purposes are stated. The digital video potential for the foreign language lesson is illustrated by the exercise. The problem of selection the high-quality teaching materials remains also urgent for digital video.

The implementation of digital video at the foreign language lessons is a powerful tool to motivate studying foreign language and country, to facilitate intercultural communication of the students in their professional sphere.

Key words: digital video, online services, Internet, USB-drive, intercultural communication.

PROSPECTS FOR THE USE OF INTELLECTUAL PROPERTY IN THE PREPARATION OF PHD AND MASTER THESES IN THE FIELD OF «LAND MANAGEMENT AND CADASTRE»

Viktor N. Moskvin
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plahotnogo St., Ph. D., Professor, Department of Cadaster and Territorial Planning, tel. (383)344-31-73, e-mail: mosk46@ngs.ru

Changing the higher education in Russia requires the development of new scientific and methodological approaches to preparation and defence of qualification papers. This is especially true of graduate and postgraduate, where the qualifying work is the dissertation. Submitted

content requirements for qualifying works, as well as materials on the use of the intellectual property created degree, in the preparation and defense of dissertations on "Land management and cadaster".

Key words: high education, candidate and master dissertation, intellectual property, application perspectives, land management and cadastre.

CONCEPTIONS AND GENERAL INFORMATION BASE OF EVOLVING MATTER

Yury S. Larionov
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Prof., Department of Ecology and Environmental Management, tel. (383)351-19-24, e-mail: larionov42@mail.ru

Nikolay A. Yaroslavtsev
«Ecoproba», 644120, Russia, Omsk, 29 Dalny, Engineer, tel. (381)234-83-69, e-mail: yaroslavcev_na@mail.ru

The article touches foundational questions of matter world evolution development. As the basic factor of such development the authors define energoinformational interaction of objects, which requires some other definition of the term “information”. It is known – it is the attribute of the matter, but modern informatics mainly uses its verbal (humanize) variant – data prepared to be used in technical systems. Representation of information as physical phenomena of electromagnetic fields and emissions allows to describe different processes of matter world from the viewpoint of informational electromagnetic interactions. Attributive electromagnetic basis of information allows to understand and formulate the conceptions of evolving matter development, among which: the conception of matter world integrity; the conception of general informational evolution of matter; the conception of informational structure formation on different matter organization levels; the conception of purposeful evolution processes formation in living matter; the conception of informational processes formation in cell evolution.

Key words: information, matter, evolution, electromagnetic fields and emissions, conception.