

# Summaries

UDC 514.76

**E.A. Moldovanova**  
**FRAMING THE FAMILY OF TWO-DIMENSIONAL PLANES  
IN FIVE-DIMENSIONAL SPACE**

The paper discusses the invariant framing of a family  $S_q$  of two-dimensional planes in five-dimensional equiaffine space  $A_5$  at all admissible values:  $2 \leq q \leq 8$ . This framing is built by movable maximal frame, which is completely interpreted both analytically and geometrically. The main signs and terms correspond to the conventional ones, while all the functions are assumed to be analytical.

UDC 681.518:519.68

**I.A. Hodashinsky**  
**ESTIMATION OF VALUES BY MEANS OF FUZZY LOGIC**

The system to estimate the values expressed as fuzzy sets is considered. A basis for the estimation is the fuzzy logic. The paper defines the ways to set up the main logic operations. The obtained results present the analysis of estimating of values at various membership functions and various functions specifying the operators of  $t$ -norms and  $t$ -conorms.

UDC 519.714.2

**N.S. Dyomin, S.V. Rozhkova, O.V. Rozhkova**  
**CONTINUOUS-DISCRETE ESTIMATION OF STOCHASTIC  
PROCESSES IN THE CASE OF RESERVATION OF  
OBSERVATION CHANNELS WITH MEMORY IN THE  
PRESENCE OF ANOMALOUS NOISES**

The paper generalized previously obtained results for the case of reservation of discrete observations channels with memory. The dependence of the accuracy of reservation multiplicity of observation channels is investigated.

UDC 159.9:681.3

**O.G. Beresteneva, E.A. Muratova, A.E. Yankovskaya**  
**ANALYSIS OF THE STRUCTURE OF MULTI-DIMENSIONAL  
DATA BY THE METHOD OF LOCAL GEOMETRY**

The paper describes the approach to analyze the structure of multi-dimensional data by the method of local geometry. The work substantiates the development of intellectual systems, which are adoptable to specific applied problems, taking into account peculiarities of the investigated data and able to built the calculation process depending on the obtained results.

UDC 539.3

**V.N. Barashkov**  
**ALGORITHM TO SOLVE THE PROBLEMS OF THEORY OF  
ELASTIC STRENGTH AND TOUGHNESS BY VARIATIONAL-  
DIFFERENCE METHOD. PART I**

The paper presents numerical procedure to define two- and three-dimensional elasto-plastic stress-strained state of a solid deformable body using variational-difference method implementing Lagrange variation principle by the method of finite differences. The physical parities are assumed to be as in the theory of small elastic-plastic strains, while the geometric parities are taken as Cauchy equations. The physical nonlinear problem is solved by the method of variable parameters of elasticity. The sample problems of deformation of axially symmetric body of ogival shape and cylindrical quadrant give the comparison of direct and iterative methods of solving the system of linear algebraic equations of high order, which is the result of usage of necessary condition of an extremum of grid analogue of a functional of a full potential energy of the system.

UDC 529.58

**E.G. Bryndin**  
**QUANTUM-DETERMINED INFORMATION TECHNOLOGY**

The paper presents quantum-determined IT to solve the problems of continuous automated processing of large amount of information without delay in obtaining results due to exchange.

UDC 539.12.01

**V.A. Triasutchev**  
**PHOTO-BIRTH OF  $\eta$ -MESONS ON PROTONS IN  
RESONANCE FIELD OF ENERGY**

The results of precise measuring cross-sections T-asymmetry of  $\gamma p \rightarrow \eta p$  process near reaction threshold as well as the results of measuring the  $\Sigma$ -asymmetry and  $d\sigma/d\Omega$  of this process were used in the paper to develop isobaric model of  $\gamma p \rightarrow \eta p$  process. The model includes eleven nucleonic resonances:  $S_{11}(1535)$ ,  $S_{11}(1650)$ ,  $P_{11}(1440)$ ,  $P_{13}(1720)$ ,  $D_{13}(1520)$ ,  $D_{15}(1675)$ ,  $F_{15}(1680)$ ,  $F_{17}(1990)$ ,  $G_{17}(2190)$ ,  $G_{19}(2250)$ ,  $H_{19}(2220)$  and a background of nucleonic pole and  $t$ -channel contribution into amplitude of vector mesons. To describe experimental dependence of full cross-sections on photon energy both  $S_{11}(1535)$  and  $S_{11}(1650)$  resonances are necessary. The calculated differential and full cross-sections as well as  $\Sigma$ -asymmetry of  $\gamma p \rightarrow \eta p$  process agrees well with experimental data at photon energy up to 2 GeV. At the energies higher than 2 GeV the amplitude of the process essentially depends on contributions of  $\rho$ - and  $\omega$ -mesons, the relation of which to nucleons is still uncertain. Variants of different  $t$ -channel expansions of the model into the area of high energy are considered.

UDC 535.36

**B.V. Goryachev, S.B. Mogilnitsky**  
**INVARIANT CORRELATIONS IN THE THEORY OF  
RADIATION TRANSFER**

The paper considers the general principle of invariance in the theory of radiation transfer. Invariant correlations true for dispersed space-limited media have been obtained and generalized for the case of medium limited by reflecting surfaces. The possibility to develop the law of diffusive radiation reflected from dispersed medium has been showed using the principle of invariance.

UDC 533.924:533.932

**V.A. Vlasov, I.A. Tikhomirov, A.V. Astapenko**  
**THERMODYNAMIC CALCULATION OF EQUILIBRIUM  
COMPOSITION OF AIR-PLASMA INTERACTING WITH THE  
COMPONENTS OF EXPLOSIVE COMPOUNDS**

Mathematical simulation were used to evaluate the composition of multi-component plasma by the methods of thermodynamic analysis. Experimental research of physico-chemical processes ongoing in multi-component plasma flow (for example under interaction of air low-temperature plasma with refractory materials and explosive compounds) needs initial information of such plasma systems. To know what components can be generated due to ongoing processes in plasma is very important for mass-spectrometry studying the composition of multi-component plasma.

UDC 547.539.4

**A.Yu. Yagovkin, E.L. Bystritsky, A.A. Bakibayev**  
**MUTUAL TRANSFORMATIONS OF SOME GLYCOLURIL  
 $n$ -HALOGEN DERIVATIVES**

Some aspects of the syntheses of glycoluril tetra- $n$ -halogen substituted (2,4,6,8-tetraazabicyclo[3.3.0]octan-3,7-dione) in various media

have been examined. The reactions of rehalogenation with various halogen-containing reagents depending on the reaction conditions have been investigated. On the basis of this research the comparative halogenation and oxidation activities of polyhalogen glycolurils have been estimated.

UDC 553.574:550.8+622.7:552.45

**L.G. Ananyeva, M.V. Korovkin**  
**MINERALOGICAL-GEOCHEMICAL STUDY OF QUARTZITES FROM ANTONOV GROUP OF DEPOSITS**

The paper presents the results of studying the quartzites of Antonov group of deposits (Kemerovo region), which are potential source of high-pure quartz raw materials. The data on details of inclusions and distribution of hard mineral impurities and autogenic formations on the surface of grains and impurity elements.

UDC 631.41: 631.416.4

**V.P. Seredina**  
**AGRO-ECOLOGICAL ASPECTS OF APPLICATION OF ZEOLITES AS SOIL-IMPROVERS OF SORPTION-TYPE AND A SOURCE OF POTASSIUM FOR THE PLANTS**

The paper gives physico-chemical and mineralogical characteristics of zeolites. The data obtained in the field and model experimental work are considered to demonstrate the influence of zeolites on the soil properties. The role and ecological value of zeolites as soil-improvers of sorption-type and is shown as well as a source of potassium for the plants.

UDC 537.312.62:620.018.45

**O.L. Khasanov**  
**METHODS OF MANUFACTURING AND PROPERTIES OF HTSC-CERAMICS BASED ON ULTRA-FINE POWDERS**

The paper presents the results of development of new technology to produce high-temperature superconductive ceramics based on ultra-fine powders including the methods of dry compacting under powerful ultra-sonic treatment. Optimal conditions for HTSC-powder synthesis and sintering of ceramics are found. The working properties of sample electro-magnetic shields, volume SHF-resonators and ceramic SQUIDES made of HTSC-ceramics are presented.

UDC 621.039.33:541.183.12

**A.P. Vergun, I.A. Tikhomirov, L.I. Dorofeeva**  
**SEPARATION OF THE ISOTOPES AND IONS WITH SIMILAR PROPERTIES IN EXCHANGE PROCESSES WITH ELECTRO-CHEMICAL REVERSE OF THE PHASE FLOW**

The paper presents the results of theoretical and experimental study on exchange separation of isotopes and ions. Reverse of phase flow in exchange system is carried out under electro-migrational substitution of isotopic and ionic forms during electro-dialyse process.

UDC 621.384.8:621.762

**V.A. Vlasov, A.D. Poberezhnikov, D.V. Savostikov**  
**SOFTWARE FOR AUTOMATIC RESEARCH OF SURFACE THERMO-DESORPTION PROCESSES BY MASS-SPECTROMETRY**

The paper describes the software for the mass-spectrometry equipment allowing to carry out investigations of thermo-programmed desorption of gases from a solid surface in semi-automated regime as well as to control the processes of calibrating the equipment.

UDC 531.7.08

**V.A. Vasiljev**  
**SEARCHING AND DECISION MAKING IN DIFFICULT PROBLEMS OF DESIGNING THE MEASUREMENT CONVERTERS**

The paper considers the problems of searching technical variants decisions, which corresponding to the specified problem. Described algorithm of actions to solve the problems of unique choice. The algorithm consists of consequent stages: an origin (finding) problems; determination of purposes; determination of alternative decisions; comparison of alternatives; choice of before-respectful alternative. Solution of the revealed problem is shown on the example of the tensor-resistable pressure sensor.

UDC 621.374

**Yu.K. Rybin**  
**CONDITIONS OF EXCITATION SINE WAVE SELF-OSCILLATIONS IN RC-GENERATORS**

Incorrect statements, discrepancies and obviously erroneous statements are in the literature on electronics by consideration of questions of excitation and generating sine wave self-oscillations in electronic circuits. In particular, amplitude balance and phase balance are considered as the conditions of sine oscillations in the circuits. The incorrectness of these statements is caused by a number of the reasons. Under these conditions oscillation has already constant amplitude. The feedback transfer factor can be determined only when feedback loop elements (the amplifier and a frequency-dependent circuit) are steady at disconnection of a loop. In some real circuits under given conditions the sine wave self-oscillations are not excited. Exact performance of amplitude balance and phase balance without transfer factor – voltage relationship also does not guarantee a stationary mode. Conditions of self-oscillations are offered to be formulated in terms of zero of the characteristic equation of oscillatory system of the generator.

UDC 621.375.026

**A.A. Titov**  
**ANALYSIS OF WORK OF AMPLIFYING CASCADE WITH AUTOMATED CONTROL OF THE CURRENT DRAIN**

The relations to calculate the voltage of a power source and the range of regulating the current drain of ultra-broad-band amplifying cascade are obtained on the case of work of the regulation system detector in a mode of a peak-level detection. The formulas to calculate the supreme admissible value of a circular modulating frequency of an amplified signal and a time-constant of loading the detector, corresponding to default permissible output power loss, caused by inconstancy of conductivity of transfer of the controlling system are given.

UDC 621.311.6

**E.Yu. Burkin, V.N. Makarevich, V.V. Sviridov**  
**ANALYSIS OF PARAMETRIC TECHNIQUES TO STABILIZE THE VOLTAGE OF SWITCH-MODE PULSE CONVERTERS**

In the paper a back, boost and back-boost of switch-mode pulse converters are observed. Three feedback control modes are surveyed: at a constant value of period, at a constant value of pause and at a constant value of pulse. The block-diagrams of control systems implementing these modes are presented. Expression and graphs of relative magnitudes at LF and HF of output ripple are shown. It is shown, that the greatest efficiency of suppression LF input ripple, with other things being equal, is ensured with the mode of constant pause, and the other two give practically the same results. The simulation results of theoretical calculations by the SW package OrcAD 9.2 are presented.

UDC 621.317.727.1

**V.L. Kim**  
**INDUCTIVE DIVIDERS OF THE VOLTAGE WITH SIMMETRYING WINDING**

A sharp increase of gain error takes place with increasing the frequency in inductive dividers of the voltage (IDV), made by ten-wire plait on ferromagnetic core, due to non-equality of shunt capacities. IDV with simmetrying winding (SW) can essentially decrease the frequency error (5 times and more). IDV is a combination of binary divider and five-section windings, the sequential connection of which make up decade winding. This leads to equalization of shunt capacities and therefore the working frequency band of IDV with SW is spreading out.

UDC 621.384.6

**E.T. Protasevich**  
**SOURCE OF MAGNETIC FIELDS WITH REGULATED LAW OF DISTRIBUTION**

The paper describes a sectioned solenoid and a scheme to control the shunting resistances, which ensures selection of different distribution laws of magnetic fields at the length of 1 meter in axial direction with the limits of voltage change laying in the range of 0,5...2,0 kOe at the beginning of linear part of the distribution.

UDC 621.313

**A.I. Chuchalin, I.O. Muravlyov, I.A. Safyannikov,  
I.N. Rossamakhin**  
**ENERGETIC PARAMETERS OF HIGH-VOLTAGE INDUCTOR  
DISK GENERATOR**

Ozonators for purification of water and air, lasers and other kinds of electrophysical equipment needs high-voltage supply (up to  $10^4$  V) at frequencies  $10^2 \dots 10^3$  Hz. The authors have considered the possibility of manufacturing and effective application of the inductor disk generator having the given characteristics for the consumers supply. The working model of high-voltage generator has been developed, mathematical model has been built and a set of investigations has been carried out to determine optimal ratio of the generator parameters and energetic characteristics under operating conditions. Simulation of the energetic characteristics of the inductor generator allowed to obtain the power voltage and the frequency required for supplying the ozonators unit and other kinds of electrophysical equipment.

UDC 621.34

**A.V. Aristov**  
**WORK PARAMETERS OF ELECTRIC DRIVE OF  
OSCILLATING MOVEMENT WITH MACHINE OF DOUBLE  
POWER SUPPLY**

The paper presents the results of studying the oscillating complexes on the base of electric machines of angular and linear movement. Special attention is paid to machines of double power supply. Working parameters of the given electric drives are analyzed including frequencies, tuning and mechanics. New controlling algorithms to ensure the resonance working regime are presented.

UDC 621.313

**R.F. Bekishev, C.I. Kachin, Yu.S. Borovikov**  
**THE WAYS TO IMPROVE ELECTRIC MACHINES  
OF COLLECTOR TYPE**

The paper reviews the main stages of development of commutative scientific school of the Tomsk Polytechnic University in 1965–2003. The paper considers the manufacturing of contacting elements of electric machines made of carbon materials. The review includes investigations to expand functional abilities of applied constructions of collector-brush units and active elements of collector machines as well as the works on supplying the engineering staff with methods and software to optimal design all variety of electric machines of collector type.

UDC 531.383

**T.G. Nesterenko, I.V. Plotnikova**  
**MICROMECHANICAL SYSTEM OF ORIENTATION**

The paper presents the fast compass, the action of which is based on the interaction of the Earth rotation velocity with the progressive oscillations of an insertion body. The work presents the results of computer modeling of the azimuthally channel of the proposed orientation system.

UDC 336.7

**I.E. Nikulina**  
**METHODOLOGY OF SELF-ORGANIZATIONAL APPROACH  
TO MANAGE REGIONAL BANKING SYSTEM**

The article considers methodology of the system-self organized research of the problems of bank management at regional level. The definition of the system, principles of the system approach and synergism are emphasized in the paper. The foundations of forming the regional banking system are also described. The regional banking system is defined, basing on the regional economy and the described methodology.

UDC 159.6

**V.P. Grigoriev, A.V. Kozlovskih, O.V. Sitnikova**  
**MATHEMATICAL MODEL OF SHORT-TERM  
FORECASTING THE DYNAMICS OF FUTURES MARKETS**

The paper presents a nonlinear mathematical model of dynamics of futures market, developed on the basis of methods of determined chaos. We reveal economical and mathematical substantiation of model, circuits of construction of dot and interval forecasts, results of testing the model and its checking for adequacy.

UDC 37

**O.A. Nikiforov**  
**ABOUT THE REGIONAL ASPECT OF DEVELOPMENT OF  
DOMESTIC BUSINESS EDUCATION (1990–1998) (BASING  
ON THE WESTERN SIBERIA DATA)**

The paper presents a brief analysis of the process of business education system formation in Russia and the Western Siberia in the nineties of XX century. The urgency of the problem is substantiated. A special attention is given to the regional aspect. The author relied in his reasoning and conclusions on sociological researches carried out in Russia. Besides, the data of the sociological research made by the author in 1998 are given, making it possible to compare the all-Russian parameters with those of one of the small cities of the region. The article refers to the materials of national and local periodicals. All this can be evidence of the representativeness of the reasoning and conclusions of the paper.

UDC 378:37.03

**L.I. Ivankina**  
**TRENDS IN MODERN EDUCATION AND THE PROBLEM OF  
INTEGRAL DEVELOPMENT OF A PERSON**

The problems development of modern education have become extremely actual under condition of forming information society. The ongoing change of basics of social-cultural pattern of the world put the problem of survival in unstable and bifurcational cultural space. This change defines the culture of education in a whole, the main purpose of which has become the education of a man to be able to orient in crisis situations, to be creative under cultural abnormal conditions and having experience to work with different types of thinking and with ideas of different cultures, to be ready for poly-cultural dialogue. Realization of such ideas in educational system means the tendency stating the value and dignity of a human, change of educational paradigm from the system "human-world" to the system "human-world-human ego".

UDC 378:37.02

**Yu.V. Karyakin**  
**METHODOLOGY OF EDUCATIONAL PROCESS AT  
UNIVERSITY AS A RESULT OF COMPUTERIZATION**

The paper reflects of continuous attempts (from 1979) to increase the quality of educational process at the lectures. A lecture is not an autonomic but a system part of educational process as a whole because of its "key" and "starting" nature. At the same time it can give essentially positive effects under natural transformation basing on system analysis-synthesis using fresh ideas of psychology, cybernetics and informatics.

BBC U012.12

**S.N. Bykov, D.N. Nesteruk**  
**DIALOG PRINCIPLE OF EXTRACTING EXPERT KNOWLEDGE  
AT ESTIMATION OF INNOVATION**

The article proposes to use a dialog principle to forecast the innovative products efficiency based on the expert data. Extraction of experts' knowledge's during dialogue is carried taking into account their public role and psycho-physiological opportunities with using computer systems of decisions support.

UDC 502.31

**V.G. Rubanov, E.V. Rubanova**  
**NOOSPHERE CONCEPT OF V.I. VERNADSKY AND  
MODERN ECOLOGICAL KNOWLEDGE**

The difficulty of modern ecological situation, sharpened contradiction among people and nature demands to know more about philosophical and natural scientific works of such scientists as V.I. Vernadsky. Genesis of noosphere and its connection with biosphere were examined in his works. There are two big systems, which interplay, supplement and explain each other. The substrata, where the sphere of mind was born (noosphere), is a biosphere. Homo sapiens must keep the environment, where he was born. But nowadays the arising conditions result in such solution of the problems of co-evolution among people and nature has (from the one hand) scientific and (from the other hand) moral component. Becoming a new geological force, a man in his activity must base on the scientific thought at first and to develop such strategy of his attitude to biosphere, which can keep human civilization.

UDC 329

**V.P. Ploskonosova**  
**METHODOLOGICAL BASES OF STUDYING THE ROLE OF  
RULING ELITE IN RECONSTRUCTION OF SOCIAL REALITY**

The paper considers methodological bases of studying the role of ruling elite.

UDC 32

**L.L. Zobova**  
**HEGEMONY OF GERMANY IN SPATIAL THEORY: IS IT  
RIDDLE?**

The paper analyzes the point of view of famous historian M. Blaug on hegemony of German economists in studying the problems of spatial theory. He believes that in the space theory is necessary to define such direction as spatial competition. Basing on analysis of foreign literature this idea is shown to be wrong.

UDC 808.2.-087.3(571.1)

**E.V. Belskaya**  
**EXPERIENCE OF LEXICOGRAPHICAL DESCRIPTION OF  
INTENSIVE VOCABULARY OF DIALECT**

The article presents the conception of a new pattern of a regional dictionary – “The dictionary of intense vocabulary: dialects of the Middle Ob area”. The suggested pattern of the dictionary is basically aimed to provide a complete description of lexical units characterized by structural-semantic property of intensity.

UDC 519.217.517.9

**Yu.G. Granina**  
**PROFESSOR-MATHEMATICIAN, THE SECOND DIRECTOR  
OF TTI – V.P. ALEXEEVSKY**

Professor Vladimir Petrovich Alexeevsky left a remarkable trace in the history of the Tomsk Technologic Institute in Russia before revolution. He was a famous scientist and lecturer in mathematics and theoretical mechanics in 1907–1911.