

TECHINFORMI

E ISSN 1987-5800

**GEORGIAN
ABSTRACTS
JOURNAL**

No. 3 (15), 2009

TBILISI

www.tech.org.ge

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List of Publications Reflected in the Present Issue

- 1. Agrarian-Economic Science and Technologies**
- 2. Building**
- 3. Collected Papers of the Institute of Water Management**
- 4. Critical Care & Catastrophe Medicine**
- 5. Economics and Business**
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- 17. Transport and Machinebuilding**
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Agrarian–Economic Science and Technologies

ISSN 1987–6335

Publisher: Institute of Agrarian Economics, founded in 2006; international scientific–methodological and practical quarterly referenced journal, in the Georgian language, abstracts in Georgian and English; address: B.14, 37 I. Chavchavadze St., Tbilisi.
www.agroeco.org.ge

Building

ISSN 1512–3936

Publisher: Technical University of Georgia, Georgian Federation of Builders; scientific–technical journal; articles in the Georgian and Russian languages, abstracts in Georgian, Russian and English; address: 68, Kostava St., Tbilisi.

Collected Papers of the Institute of Water Management

ISSN 1512–2344

Publisher: Institute of Water Management; published since 1934; articles and abstracts in the Russian, Georgian, and English languages; address: 60 I.Chavchavadze St., Tbilisi.

Critical Care & Catastrophe Medicine

ISSN 1512–2689

Official Journal of the Critical Care Medicine Institute, Critical Care Medicine Department of Tbilisi State Medical University & Georgian Association of Disaster and Critical Care Medicine; articles in the Georgian, English, Russian, German or French languages; abstracts in English and Georgian.

Economics and Business

ISSN 987–5789

Tbilisi Iv. Javakhishvili State University, Faculty of Business and Economy; international referenced and reviewed scientific–practical journal, published since January 2008; bimonthly; address: 1, University St., Tbilisi.

Energy

ISSN 1512–0120

Scientific–technical journal; articles in the Georgian and Russian languages; abstracts in Georgian, English and Russian; address: 40 I. Abashidze St, 0179, Tbilisi.
www.directory.ge/client/Energy

Georgian Chemical Journal

ISSN 1512–0686

Publisher: Georgian Chemical Society; published since 2001; articles in the Georgian, Russian, English languages; address: 3, Chavchavadze Ave., Tbilisi.
www.georgiachemj.ge

Hydro Engineering

ISSN 1512 – 410X

Publisher: Technical University of Georgia; quarterly publication; articles in the Georgian, Russian and English languages; abstracts in Georgian, Russian and English; address: 77 Kostava St., Tbilisi.

Intelektuali (Intellectual)

ISSN 1512–2530

Publisher: Public Academy of Georgian Young Scientists; international scientific journal; abstracts in Russian and English; address: 77, M.Kostava St., Tbilisi.
www.intelektuali.ge

Komersanti (Businessman)

ISSN 1512–4142

Publisher: Tbilisi State University of Economic Relations; quarterly international reviewed and referenced journal; published since 2006; articles in the Georgian, English and Russian languages, abstracts in English and Russian; address: 55 Ketevan Tsamebuli St., 0144, Tbilisi.

Novation

ISSN 1512–3715

Publisher: Kutaisi Scientific Centre; periodical scientific journal; articles in Georgian, English, Russian; abstracts in Georgian, English, Russian.

Proceedings of the Georgian National Academy of Sciences

ISSN 0132–1447

Publisher: Georgian National Academy of Sciences; articles (mathematical and physical sciences, agricultural sciences, medical sciences, humanitarian sciences) in English; annotations in English and Georgian; quarterly publication; address: 52, Rustaveli Ave., Tbilisi.

<http://www.science.org.ge>

Proceedings of the Georgian National Academy of Sciences – Biological Series B

Publisher: Department of Biology of the Georgian National Academy of Sciences; founded in 2001; articles in English; abstracts in Georgian and English; address: 52 Rustaveli Ave., Tbilisi.

www.acnet.ge/matsne/biology

Proceedings of the Georgian National Academy of Sciences – Chemical Series

ISSN 0132–6074

Publisher: Georgian National Academy of Sciences; articles and abstracts in Russian, Georgian, and English, quarterly; address: 5 Jikia St., Tbilisi.

Radiological and Agroecological Researches

ISSN 1512–2786

Publisher: Institute of Agrarian Radiology and Ecology; articles in Georgian; annotations in Georgian, Russian, English.

Sakartvelos Ekonomika (Georgian Economy)

Monthly scientific–analytical journal; published since 1997; articles in Georgian; annotations – in Georgian and English; address: 25 Kekelidze St., Tbilisi.

www.geoeconomics.ge

Transactions – Automated Control Systems

ISSN 1512–3979

Publisher: Technical University of Georgia; articles and abstracts in Russian, Georgian, and English; address: 68, Kostava St., Tbilisi.

Transport and Machine Building

ISSN 1512–3537

Publisher: Technical University of Georgia; Faculty of Transport and Machine-building; scientific–technical journal; quarterly; articles in Georgian and Russian; abstracts in Georgian, Russian and English.

SUBJECT ENTRIES

A. SOCIAL SCIENCES

- A1. State and Law. Jurisprudence
- A2. Sociology. Demography
- A3. Economy
- A4. Education
- A5. Informatics/Computer Science
- A6. Other Social Sciences

B. NATURAL AND EXACT SCIENCES

- B1. Mathematics. Mechanics. Physics. Cybernetics
- B2. Chemistry. Biology
- B3. Geology. Geodesy
- B4. Geography. Cartography. Astronomy
- B5. Other Natural and Exact Sciences

C. TECHNICAL AND APPLIED SCIENCES. SECTORS OF ECONOMY

- C1. Power Industry
- C2. Electrical Engineering. Electronics. Radio Engineering. Communications
- C3. Automation & Telemetry. Computer Engineering
- C4. Mining. Metallurgy. Chemical Industry
- C5. Mechanical Engineering. Instrument-making
- C6. Light Industry
- C7. Food Industry
- C8. Construction. Architecture
- C9. Agriculture and Forestry. Fishery
- C10. Water Industry. Melioration
- C11. Foreign and Domestic Trade. Tourism
- C12. Transport
- C13. Medicine. Healthcare

D. INTERSECTORAL PROBLEMS

- D1. Organization and Management
- D2. Environmental Protection. Ecology
- D3. Statistics
- D4. Other Intersectoral Problems

A. SOCIAL SCIENCES

A1. State and Law. Jurisprudence

UDC 321.01–054.57

A1.1. State policy towards ethnic minorities. /G.Maduashvili/. Intelektuali. – 2008. – No.7. – pp. 51–55. – Geo. res.: Geo, Eng, Rus.

The work discusses the state policy towards ethnic minorities. For the sake of a comparative analysis, the article deals with both the ongoing policy and the policy implemented by the former authorities.

UDC 343(094.576)

A1.2. Execution of commands or orders as a circumstance excluding responsibility under the Criminal Code of Georgia. /T.Dolidze/. Intelektuali. – 2008. – No.7. – pp. 56–59. – Geo. res.: Geo, Eng, Rus.

The legislative and practical characterization of the execution of commands or orders as the circumstance excluding guilt. Recommendation in connection with the above.

UDC 342.55

A1.3. Invalidity and insignificance of acts of local self-government agencies. /G. Khunashvili/. Kommersanti. – 2007. – No.3 (4). – pp. 136–143. – Geo. res.: Rus, Eng.

Considered are such important and problematic matters of administrative-legal acts issued by local government as their invalidity and insignificance. In particular, the types of administrative-legal acts are analyzed. Special attention is given to their invalidation and to the peculiarities of insignificant administrative-legal acts, also to the consequences of their application in the administrative-legislative practice. Proposed has been a matter of the necessity of recognizing an insignificant administrative non-act as invalid as well of complete revocation of such acts.

A2. Sociology. Demography

UDC 312

A2.1. The demographic policy of Georgia (how to survive). /V.Lortkipanidze, A.Totadze/. Agrarian–economic Science and Technologies.– 2008. – No.1. – pp. 107–110. – Geo. res. Eng.

The existing in Georgia demographic situation is considered. The State intervention is regarded as a priority necessity in the system of measures for improving the situation. It is demonstrated what unity of necessary components implies the state demographic policy. The focus is made on the activities to be carried out (for a period until 2025) on which basis the country's demographic situation will improve.

UDC 312

A2.2. Strategic–conceptual positions of the state regulation of the demographic policy. /J.Makharadze/. Agrarian–economic Science and Technologies. – 2008. – No.1. – pp. 111–116. – Geo. res. Eng.

On the basis of a critical analysis of the principal segments of the factors determining the assessment of the demographic situation, the number of Georgian population, its gender status, and other demographic indicators, as well as a forecast for 2050 are presented. The strategic-conceptual positions of the state regulation of economic and social processes of the population's reproduction are proposed.

A3. Economy

UDC 658.284

A3.1. Cell communication market in Georgia. /M.Ghaniashvili/. Sakartvelos Ekonomika. – 2008 (7). – Geo. res. Eng.

According to available statistics, the Georgian consumer spends almost 70% of his income on communication services. According to an annual activity report by the Georgian National Communications Commission, in 2007, the number of active subscribers of mobile communications network increased by 895,000 and reached 2.6 million.

UDC 339.138

A3.2. Peculiarities of marketing activity on the electronic market. /I.Gabadadze, A.Mushkudiani, S.Nemsadze, I.Tsereteli/. Novation. – 2008. – No.2. – pp. 94–98. – Geo. res.: Geo, Rus, Eng.

The main seller company groups on the electronic market, the principles of their activity, as well as the buyer groups with their characteristic peculiarities are highlighted. Productivity factors of the electronic business and the directions influencing consumer values of the electronic marketing are explained.

UDC 339.732:681.3

A3.3. Selection of alternative investment protection methods. /G.Chikovani, R.Pataraiia, L. Lagundaridze/. Building. – 2008. – No.2 (9). – pp. 70–74. – Geo. res.: Geo, Rus, Eng.

Different investment coverage models are reviewed – traditional, egalitarian and graduated, or stepwise. Positive and negative aspects of their application are analyzed. Comparative calculations revealing the advantage of a specific model in the investment coverage process have been made by using these models. Periods of time when an advantage is given to the calculations made under a specific model which enable both the investor and the entrepreneur to take a mutually beneficial decision have been identified.

UDC 65.018.3

A3.4. Small business features. /M.Mchedlishvili, E.Tatumadze, E.Mirotadze, K.Chincharashvili/. Building. – 2008. – No.2 (9). – pp. 84–90. – Geo. res.: Geo, Rus, Eng.

Features of small and medium businesses are discussed. An analysis of the strengths of a small business over big companies is made. These strengths are: flexibility, possibility of territorial maneuvering. Also discussed are the weaknesses of a small business: funding difficulties; increased sensitivity to economic changes; low level of specialization; shortage of export potential; personal responsibility of the entrepreneur for his business. Notwithstanding its negative aspect, small business has played an important role in the implementation of many directions of the economic development, scientific and technical advance worldwide. Consequently, one can presume that the development of small business might become one of the important conditions for scientific and technical advance in the economy of Georgia.

UDC 351.763

A3.5. Poverty and the main directions of its overcoming. /L.Chikava/. Economics and Business. – 2008. – No.1. – pp. 77–88. – Geo. res.: Geo, Eng.

According to international statistics, a “subsistence minimum” is the amount that is necessary for meeting the daily vital needs. An individual who cannot afford spending more than US\$ 2/day on average shall be considered poor, while the one who cannot spend more than US\$1/day – extremely poor, or pauper. According to the 2006 statistics, 16% (over a billion people) of the world population lived below the extreme poverty line, and 23% - below the poverty line. The article provides the statistics on the lowest-income countries. In the most of them, the specific weight of the underfed population is characterized of a growing trend. The causes of poverty and the main trends and measures of its overcoming are given.

UDC 35.087.43.–057.75

A3.6. Advantages and disadvantages of a pension fund scheme in Georgia. /I.Chkhaidze/. Economics and Business. – 2008. – No.1 – pp. 119–125. – Geo. res.: Geo, Eng.

The article deals with the implementation of a pension fund scheme by the State for the "waiting" category (old-age pensioners, sickness pensioners, disability pensioners) by adhering to the legal principles of social and economic succession. The inefficient pension fund scheme implemented in Georgia during 1998 to 2003 has resulted to the accumulation of significant pension indebtedness. By 2004 the government exercised the coverage of its pension liabilities. At present, the legal basis for repayment of the “old-age pension” is the Law on State Pensions drafted by Georgian Parliament and enacted in 2005. In the subsequent years the monthly the pension amount had somewhat increased, however the payment of a worthy pension according to the length of service may be fixed and paid only after the minimum pension will have equal the “subsistence minimum”. By now the minimum monthly pension is 3-4-times behind the subsistence minimum. In the estimation if economists, in order to provide normal pension, 3-4 employed persons per pensioner are required. Under the present level of unemployment in Georgia, the number of employed person per pensioner is 4-5-fold less the required number.

A4. Education

UDC 330.83

A4.1. On some questions of logic in studying mathematics. /M.Deisadze, M.Nikoleishvili/. Novation. – 2008. – No. 2. – pp. 113–117. – Geo. res.: Geo, Rus, Eng.

A rather topical issue – the necessity of profound and thorough learning of logical sums and mathematical rules, so that the future teacher be able to form in a pupil already in elementary classes the general mathematical skills, such as the ability of logical thinking – the ability of seeing the essential, of generalization, of analyzing and synthesizing, of a sequential decision-making, of a clear and sound thinking. Sound thinking does not necessarily mean to be genuine. The soundness of thinking does not consist in the reflection of the events of reality but in a succession of ideas, in the sequential binding of ideas, in their interdependence, in the fact that the ideas are not dependent on us, on our wishes and is not of a subjective nature. In logical sums the proceeding of one idea from another is a necessity. The article deals with the examples of denying syllogism, the rules. The objective is that the pupil could develop the ability of sound thinking when solving the logical sums and do not resort to own experience or knowledge relating to the condition given in the task. The examples of true and false statements, of the ability to negate and/or assert the statements, of the interrelationship of the statements facilitate the development and formation in children of general mathematical skills, logical thinking skills and, above all, the practical implementation of the mathematical knowledge.

UDC 576.8

A4.2. A combined test method in parasitology. /M.Mandaria/. Novation. – 2008. – No.1. – pp. 65–68. – Geo. res.: Geo, Rus, Eng.

The application of a combined test method assists in the conduct of an examination in a short period of time and in the comprehensive assessment of knowledge, provided the proper method has been chosen. Based on the specifics of the Parasitology course, a combined test has been chosen to reveal the following: 1. (a) the student's knowledge of the theoretical material; (b) the student's ability to solve the specific problem using his/her theoretical knowledge. 2. how well the student knows the difficulty of pathogenic action of each parasite. 3. how well the student knows the modern methods of laboratory diagnostics. The test includes questions of different complexity arranged in random order. The proposed method almost totally excludes the attempts of the students to cram the right answers. The tests comprehensively cover both the theoretical and practical course of Parasitology.

A5. Informatics/Computer Science

UDC 024.4:681.518

A5.1. Informatics, program technologies and modern directions of their development and teaching. /G.Gogichaishvili, A.Prangishvili, G.Surguladze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 7–15. – Geo. res.: Geo, Rus, Eng.

The questions concerning the essence of informatics as a complex, interdisciplinary science, the analysis of its structural components, the present status and development trends are discussed. Fundamental program platforms and languages which are widely applied at universities of the USA and the Europe are considered. Proposed are the basic scientific directions and results that have been developed and obtained by the authors at the Faculty of Informatics and Control Systems of the Georgian Technical University (GTU). Also significant are the reflection of these results in the training process, the creation of a Georgian-language collection of training and methodological literature, including electronic manuals.

UDC 024.4:(082.22)

A5.2. The forgotten quotations. /H.Wedekind/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 16–22. – Geo. res.: Geo, Rus, Eng.

Proposed are the author's experimental results (based on categorical analysis, relational models and theory of logics) stating that an intricate, basic philosophical terminology is best presented by adopting Wittgenstein's aphoristic style. According to Wittgenstein, it is shown how easily the purpose is achieved when these terminological problems are solved. The word "forgotten" fixes that nothing is new in this paper and that almost all can be found in encyclopedias.

UDC 512.64

A5.3. Invariant equations and inequalities for elementary Petri nets. /R.Wolfgang/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 23–31. – Ger. res.: Ger, Geo, Eng, Rus.

The structure and behaviour of elementary Petri nets can be presented in simple linear algebra. They are described by means of vectors and matrices. At the same time, a system of equations may be formed and the properties of the elementary Petri net calculated. The work offers definite theoretical algorithms and practical examples based on the invariant equations, inequalities and their combinations.

UDC 519.674

A5.4. Geometrical modeling and graphic methods of the task solution. /V.Sesadze, G.Chikadze,V.Kekenadze, T.Kaishauri/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 7–15. – Rus. res.: Rus, Geo, Eng.

The general principles of applied geometry and geometrical modeling are formulated. The method of geometrical modeling that reduces the environment research problem to a mathematical task occupies the leading position among other methods of research. The methods make it possible to solve complex problems of science and technology, project new phenomena, plan new technology means operating in the optimum modes. Geometrical models may be successfully applied in various fields of science, in particular, in economic planning and the automated control systems. All the above has preconditioned the development of a new direction such as computer graphics.

UDC 519.853:62.404.2

A5.5. A new algorithm to analyze the problem of a viscous streamline profile in the case of a steady flow. /T.Obgadze, I.Davtashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 36–43. – Geo. res.: Geo, Rus, Eng.

An algorithm based on the principal laws of mechanics and classical experiments is proposed. Initially, the work deals with incompressible, viscous flows and then, by means of the Christianovich recalculation experiments, moves to the aerodynamic characteristics of a profile for compressible fluids. The work is based on the application of a nonlinear programming method to minimize the integral error, when the boundary conditions represent the law on conservation of mass and the Bernoulli integral equation for viscous fluids. The pitch moment and the lift ratio for the zero seat angle are calculated.

UDC 517.988

A5.6. On a question of definition of equivalent-complex coefficient of nonlinear systems. /N.Mchedlishvili, T.Imedadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 44–47. – Geo. res.: Geo, Rus, Eng.

The work aims at solving a problem of the certain class of analysis of nonlinear systems, namely, the establishment of a link between two big groups of methods of research: the method of harmonic balance and the functional description of objects in time domain. The structure of the study systems is represented by in-series linear dynamic and nonlinear static parts (models of Wiener and Hammerstein) which are described by the Volterra's series. The article presents the algorithm of deriving a mathematical model of a wide class of nonlinear dynamic systems as a complex gain. As a result of research, expressions for the calculation of complex gains have been derived.

UDC 519.673

A5.7. On the method of determining the probability of solving a problem on multiprocessor computer systems in the presence of float time. /Z.Jojua, N.Jojua, I.Mikadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 48-52. – Rus. res.: Geo, Eng, Rus.

An analytical model of determining the probability of problem solving on a multicomputer system in the presence of a Poisson failure flow and float time for problem solving is developed. The problem time is considered to be distributed in unit functional form. The time of recovery of failed processors is considered. The failed processor recovery time is allotted by the exponential law. The system reconfiguration time is distributed by an arbitrary law. A function of the probability of solving a problem in the given time is introduced and the proper analytical expressions are compiled. After a series of transformations using the Laplas–Stieltjes' methods, a system of linear algebraic equations is obtained, whose solution finally provides the problem solving probability function in Laplacian form.

UDC 519.688

A5.8. Adaptive data recording algorithms in automated control systems. /T.Macharadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 53–57. – Rus. res.: Geo, Eng, Rus.

The paper deals with optimal algorithms that ensure in multi-channel systems the input and registration of discrete data values given their spectral characteristics, which significantly decreases the level of data to be processed.

UDC 519.688

A5.9. Committee similarity measures. /T.Zhvania, M.Kiknadze, M.Magradze/. Transactions, Automated Control Systems. – 2007. – No.1 (2). – pp. 58–64. – Geo. res.: Geo, Eng, Rus.

One of the most widely known classes of algorithmic similarity measures are the so-called committee similarity measures. The article deals with the formation of two algorithms of the algorithmic and committee measures based on the available and formed similarity measures which enables the practically error-free recognition of the training sample realization.

UDC 519.22:301.153

A5.10. Public opinion building mathematical model. /O.Shonia, G.Nareshelashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 65–67. – Geo. res.: Geo, Eng, Rus.

On the basis of a public opinion probability analysis, a mathematical model of influencing a public group has been developed. A provision on the possibility of building the final general opinion in the group is justified.

UDC 519.237.8

A5.11. The recognition reliability prediction on the basis of clustering results. /O.Verulava, T.Todua, L.Verulava/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 68–72. – Geo. res.: Geo, Eng, Rus.

A problem of the recognition processes prediction on the basis of clustering results is considered. In particular, a notion of a “pattern (cluster) influence” zone is introduced. Considered are the cases when the influence zones do not intersect, when they intersect and the non-compact clusters are considered as a special case of the latter.

UDC 681.5.017

A5.12. On the test control problem formalization. /Z.Bosikashvili, D.Kapanadze, T.Zhvania/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 73–77. – Geo. res.: Geo, Eng, Rus.

The issues of building formal automatic test control models are considered. The general task of the automatic generation of control tests for various subject areas allowing the development of automated test control systems based on the single formalism has been set.

UDC 519.688

A5.13. Network control process algorithms. /G.Janelidze, B.Meparishvili, T.Meparishvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 78–81. – Geo. res.: Geo, Eng, Rus.

Discussed are the problems of effective flow control in a network with complicated topology, representing generally the decision-making in a specific situation. In order to solve the set problem, artificial intelligence as a high-level method is proposed. Proceeding from specifics of the object, the joint application of artificial neural networks, systems of frames and genetic algorithms is rather expedient. For this purpose, the article proposes a generalized network control algorithm where the basic functional blocks are intellectual monitoring and control algorithms on the basis of databases as well as knowledge bases, frame model of knowledge and a logical machine.

UDC 519.673

A5.14. Simulation of realization mechanisms in object-oriented design. /T.Sukhiashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 82–85. – Geo. res.: Geo, Eng, Rus.

Most automated systems are characterized of evolutionary development conditioned by the internal self-organization and perfection. The system requirement changes ask for the respective changes in the design. The article discusses simulation and identification of the requirement realization mechanisms, with an allowance for correction of the model. For this purpose, the mechanism of realization is presented as a conceptual fragment which, while defining the requirement semantics, can be disclosed and examined for the presence of concealed structural and behavioral details.

UDC 519.86

A5.15. On the capability maturity model. /L.Bezhanishvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 86–91. – Geo. res.: Geo, Eng, Rus.

Users' claims to the quality of software have brought to the investigations forefront the software quality assurance. The quality of a developed system was announced as its property and was expected to be planned and controllable. The product quality was found to be in direct relation to the quality of processes used for its making. The understanding of this fact has become fundamental in developing the CMM/CMMI model designated for the maturity estimation of the main groups of development processes. In Georgia, the learning, *a fortiori* the certification, according to the CMM/CMMI still has an episodic character. Therefore, the problem of making of a cognitive system for estimating the possibilities of an organization, as well as the training in the principles of organizational culture is very topical. No less important is the working out of recommendations for the improvement of organizational processes.

UDC 519.256: 681.518

A5.16. Database design for conference organizers. /N.Topuria/. Transactions, Automated Control Systems. – 2007. – No. 1(2). – pp. 92–95. – Geo. res.: Geo, Eng, Rus.

A computer-aided database design for conference organizers is discussed. The design of a conceptual model is carried out by means of the ORM diagram and corresponding ER model. The theoretical and instrumental means of the structural and semantic specification of the ORM/ER diagrams are shown.

UDC 681.518.001.63

A5.17. Design of corporate information systems. /L.Petriashvili, M.Okhanashvili/. Transactions, Automated Control Systems. – 2007. – No.1 (2). – pp. 96–99. – Geo. res.: Geo, Eng, Rus.

The multivariate data models and the main principles of their use are considered. They occupy a special place in the full-value data analysis. The online analytical processing (OLAP) technology allows not only to obtain the statistics on the enterprise activity but also to search for regularities therein, to see the trends of various processes, and to make forecasts. In other words, OLAP provides the analysts and the enterprise administration with the necessary material for the effective managerial decision-making.

UDC 681.3.06

A5.18. Organization of program servers in corporate networks. /W.Reisig, G.Surguladze, D.Gulua/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 100–104. – Geo. res.: Geo, Eng, Rus.

The client–server architecture of corporate networks, the server–farm (terminal–server) of which ensures management of the user working sessions and uniform distribution access of clients to physical servers is considered. As for the task of a cluster (file–server), it consists in the reliable storage of public resources (virtual IP–addresses and network names, joint programs and services, distributed catalogues, etc.) and in the organization of access to external memory (e.g. an array of SAN–disks).

UDC 681.518:65.011.56

A5.19. Automated design of distributed databases in .NET environment. /G.Surguladze, N.Topuria, L.Kvavadze, I.Vacharadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 105–108. – Geo. res.: Geo, Eng, Rus.

The problems of design and realization of relational databases for the distributed systems of organizational management on the basis of modern information technology (.NET, UML) are discussed. The concept of using a reverser in the problems of support of intercompatibility of ORM/ERM models and DDL–language is proposed. The results of experiments are adapted in the MsSQL Server and ADO.NET environment.

UDC 378:681.3.068

A5.20. Design concept of a computer system "University" for examination and evaluation of knowledge. /G.Ghvinepadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 109–110. – Geo. res.: Geo, Eng, Rus.

For the purpose of improving the quality of training at higher educational institutions, the creation of a computer system "university" is proposed, the basic function of which will consist in the evaluation of knowledge of students by the automation of half-year examinations. To simplify the processes of development and introduction of the system, their stage-by-stage implementation would be desirable.

UDC 519.254: 681.518

A5.21. A reduction algorithm to ensure relational completeness of database languages. /A.Kobiashvili, E.Gvaramia/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 111–114. – Geo. res.: Geo, Eng, Rus.

A reduction algorithm allowing for reduction of an arbitrary expression of the relational calculus to a semantically equivalent expression of the relational algebra is proposed. An example illustrating this algorithm is presented and the advantage of the algorithm is shown.

UDC 681.5.015

A5.22. Modeling of workplaces in the design of distributed control systems. /T.Sukhiashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 115–117. – Geo. res.: Geo, Eng, Rus.

In the design of distributed control systems, matters a correct definition and modeling of workplaces and actor–performed operations. The article discusses a means of defining the actor roles on the basis of precedent analysis and of the work processes carried out thereby by means of activity diagrams.

UDC 519.688

A5.23. Algorithm of the accelerated calculation of the number of up states of complex systems. /R.Samkharadze, M.Kalabegishvili/. Transactions, Automated Control Systems. – 007. – No.1(2). – pp. 125–128. – Geo. res.: Geo, Eng, Rus.

Proposed is an algorithm of the accelerated calculation of the number of up states of complex systems, consisting in the following: a mask representing a minimum quantity of efficient, serviceable conditional elements of reliability is formed; the mask is divided into groups, wherein the generation and exhaustive search of necessary variants are carried out.

UDC 061.68

A5.24. Definition of interrelations between basic characteristics of a computer network. /N.Lolashvili, M.Tevdoradze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 129–134. – Rus. res.: Geo, Eng, Rus.

A series of technical and economic characteristics of computer networks are considered and the basic ones are outlined, such as the reliability, topology, cost and time parameters. The interrelation and interdependence between them is established. In addition, the complex parameter of the computer network efficiency is introduced.

UDC 061.68.004.12

A5.25. Determination of the quality of service of distributed multimedia systems. /N.Bibiluri, M.Tevdoradze, E.Umudumiadis, K.Kordzakhia/. Transactions, Automated Control Systems. – 2007. – No.1 (2). – pp. 135–140. – Rus. res.: Geo, Eng, Rus.

The problem of the quality of service of distributed multimedia systems is discussed. The service quality is shown to depend on many factors, the principal being the characteristics of the multimedia system components. The article individually discusses these characteristics and cites their distinctions from the characteristics of the traditional system components. A processing scenario QoS of the multimedia system has been worked out.

UDC 061.68.004.12

A5.26. Analysis of the quality of service characteristics of data communications networks. /L.Mirtskhulava., M.Kiknadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 141–143. – Geo. res.: Geo, Eng, Rus.

The article describes the "best effort" delivery model of data communications networks that offers a point-to-point delivery service and provides for the quality of service with the shortest delivery time, but with no commitment as to bandwidth or latency.

UDC 681.5

A5.27. Problems of automatic error detection and reliability increase of the measuring information in automated systems. /N.Kunelashvili, N.Eremeishvili, M.Kiknadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 144–147. –Rus. res.: Geo, Eng, Rus.

The pressing questions of the error detection of the measuring information in audit systems are considered. The basic requirement is the reliability of audit results. A built-in control of catastrophic and degradation refusals is provided for. The proposed method of the reliability increase of the measuring information considerably improves characteristics of the audit system.

UDC 65.011.56

A5.28. Structural analysis of automated management for industrial projects. /O.Gabedava/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 148–150. – Geo. res.: Geo, Eng, Rus.

Descriptions of the control constructs of an automated control system of industrial projects are given, which ensure the reliability, integrity, flexibility and profitability of subcontrols.

UDC 061.68

A5.29. Netwok data security concept. /O.Shonia, D.Shonia, I.Gogokhia, N.Poladashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 151–154. – Geo. res.: Geo, Eng, Rus.

A detailed analysis of computer crimes is given and the issues of struggle against them are considered. The problems of information security for information systems are discussed and the general informational safety concept in such networks has been established.

UDC 681.518

A5.30. Security of information systems. /O.Shonia, T.Sherozia, D.Shonia, N.Tsomaia/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 154–156. – Geo. res.: Geo, Eng, Rus.

The problems of secure operation of information systems are analyzed. The main directions of overcoming these problems are considered, taking into account the user demands.

UDC 351.86.001.01

A5.31. Emergencies control and liquidation system. /O.Shonia, K.Odisharia, N.Poladashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 156–159. – Geo. res.: Geo, Eng, Rus.

The work deals with the necessity of creation in the country of a system to control emergency situations resulting from natural disasters and man-made activity. A concept of the setting up and operation of the system has been worked out.

UDC 681.3.053

A5.32. Fractal coding of images under distortion of the communicated data. /N.Kharatishvili, I.Chkheidze, V.Steperman/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 160–163. – Rus. res.: Geo, Eng, Rus.

The effects of distortions on the communicated information in using the fractal compression method when coding images are considered. The decoding is found to be more sensitive to the errors in the domain number than to the distortions in the transformation index. It is, therefore, recommended that the method of error detection and correction be used for the domain number transfer and for upgrading thus the quality of restored images.

UDC 621.31

A5.33. Fiber–optic telecommunication network of an electric power system. /I.Modebadze, G.Murjikneli, N.Modebadze, N.Eremeishvili, E.Popkhadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 164–169. – Geo. res.: Geo, Eng, Rus.

The questions of design of a fiber–optic telecommunication network of an electric power system for the purpose of increase of the reliability and quality of communication between power objects are considered. In particular, it is recommended to have in the system of power industry both own and leased telecommunication channels. An opportunity of reducing the cost of the system by suspension of an optical fiber on a high-voltage line is discussed. The advantages of fiber–optic communication over other communication systems as well as the dependences of its attenuation upon the length of a wave and the distances of a beam distribution without preliminary strengthening from the communication speed are given. The parameters of the optic fiber and fiber-optic cables of different kinds are considered and the methods of their suspension on high-voltage transmission lines are demonstrated.

UDC 616.31

A5.34. Making of diagnosis in the expert system of disgnostics of dental diseases. /G.Gogichaishvili, S.Manukov/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 170–176. – Rus. res.: Geo, Eng, Rus.

The method of making diagnostic decisions in an expert diagnostic system of dental diseases is considered. The methods of a formalized presentation of the symptomatic facts and generation of diagnostic decisions with the aid of an algebraic system-type model are given. A significant reduction of searching for possible decision options is carried out by using the mechanisms of generalization and semantic tolerance of fragments.

UDC 631.6

A5.35. Discussion on the generation of information in problems of optimum water allocation. /E.Asabashvili, M.Vartanov, Z.Tsveraidze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 177–180. – Geo. res.: Geo, Eng, Rus.

The economically optimum allocation of deficient water resources in the amelioration systems can be carried out only by means of a feedback information management system. Consequently, before making managerial decisions on the allocation of water resources, the management center should receive information on the amount of water required by each subsystem. Concurrently, the information on the losses, or the economic effect that may be obtained by each water consumer in the case of different quantity of water allocated thereto.

UDC 301.18

A5.36. Medico–sociological database on elderly Georgian citizens. /K.Kachiashvili, B.Meparishvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 181–183. – Geo. res.: Geo, Eng, Rus.

A gerontology database created by the authors within the MsAccess program environment is proposed. It is designated for compact storage of gerontology information in a computer for the purpose of an operative and convenient retrieval of any part thereof for the follow-up processing by modern mathematical methods and service facilities. The following tasks were solved to generate the database: The data organization in the memory and their management; the information search and its correction where necessary; the selection of data with the indicated criterion; the creation of the forms and reports; the elaboration of special macros; the creation of graphs and dialogs; the representation of the information in the needed forms.

UDC 616-07

A5.37. A systems approach to early diagnostics of the organism pathology. /B.Meparishvili, G.Janelidze, T.Meparishvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 184–188. – Geo. res.: Geo, Eng, Rus.

The necessity of design and introduction of a medical expert system for early diagnostics and treatment of high-risk systemic diseases is considered, in particular, of a general monitoring diagnostic system of an organism for determining the a pathological segment, as well as and the degree of the pathology itself. The solution of the problem consists in the determination of the values of the coefficients of the organism's graphic model elements, when the value of the resultant vector of the model is adequate to the actual anamnesis of the patient. The problem may be successfully solved using genetic algorithms. The presented concept of the systemic monitoring may become the basis of a new paradigm – systemic medicine, as an area of systems modeling, many-sided investigations and imitational experimentations of the human organism.

UDC 621.774.35

A5.38. Estimation of shock interaction forces by the catastrophe theory method. /V.Sesadze, V.Kekenadze, G.Chikadze, T.Kaishauri, N.Pailodze/. Transactions, Automated Control Systems. – 2007. – No. 1(2). – pp. 189–192. – Geo. res.: Geo, Eng, Rus.

The questions of estimation of the shock interaction forces of the arbor with a rod in the deformation center of the automatic tube mills using the method of R.Thom's catastrophe theory are considered. For the purpose of determining the maximum tensions arising in the automatic mills' cores, the effects of forces of shock interaction determined by the offered technique should be taken into account. R.Adamia's interaction model, considering the peculiarity of the shock process in tube–rolling on automatic mills, is used for the analysis. Practical calculations of shock interaction forces made under the given methods demonstrate that we are dealing with a crease-type catastrophe.

UDC 681.513.5

A5.39. A multimedia training program in optimal control systems. /I.Mosashvili, V.Sesadze, N.Maglakelidze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 193–196. – Eng. res.: Geo, Eng, Rus.

The making of electronic manuals is one of the most promising trends in use of computer technologies in the training process. The multimedia approach is being used in teaching the course "Theory of Optimal Control". It helps the student to represent the optimal control problem and to resolve it in different ways. The student's self-training on the majority of technical subject shall be possible only with the aid of printed material (books, manuals, periodicals), which requires increased concentration of attention and consumes much time. An electronic training aid in the form of interactive multimedia training programs, which includes hypertext, illustrations, video and audio fragments, combine in itself a pictorial representation of the material and communication with the trainee.

UDC 631.171

A5.40. Description of a functional structure of a farm control system for designing a computer-aided crop forecast system. /S.Pochovian/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 197–199. – Rus. res.: Geo, Eng, Rus.

The description of the main functions and solved problems during operation of a farm management system for designing a computer-aided crop forecast system is given.

UDC 621.316

A5.41. Electric power distribution method using the “golden section” proportion. /G.Macharashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 200–203. – Geo. res.: Geo, Eng, Rus.

The “golden proportion” guarantees the sustainability and harmony between elements of a system in the area of technology, economy, architecture, painting and public sphere, i.e. the state corresponding to the “golden section” rule. This proportion implies the division of the system into two unequal parts, in the following proportion: $1=0,618+0,382$. The “golden section” proportion has been used for the first time for purposes of electric power distribution among the consumers. For that purpose an analysis of power distribution in the Georgian grid for 1990, when the situation in the power industry was more or less stable, has been carried out. This year, the electric power has been distributed according to the “golden section” rule.

UDC 801.54

A5.42. Computer-aided etymologizing. /G.Gvinepadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 204–206. – Geo. res.: Geo, Eng, Rus.

Etymologizing is the most complex linguistic task. It is especially complicated for “primordial” terms. Many unsuccessful attempts to etymologize such terms have made many scientists reject the idea referring to their being the so-called “unmotivated” words. As a result of our research, we have found the concept WATER to be the root word for the prime vocabulary. Based on this supposition, a series of Georgian words, being considered “hopeless” in this sense, have been etymologized. It is, however, evident that for further progress of the investigation, a serious computer support is necessary. We propose a concept of computer-aided etymologizing. The program will estimate the potential of etymological linkage between pairs of consonant words, the final estimate being made by experts.

UDC 336.71

A5.43 Design of data warehouse for decision support system after the example of a commercial bank. /I.Vacharadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 207–210. – Geo. res.: Geo, Eng, Rus.

Modern software UML technologies make possible to automate design of automated control systems and to essentially reduce the time and costs of the system making, to create conditions for producing standard packages, using modern programming languages (C#, C++, VB, JAVA). The work, after the example of a commercial bank, considers the making of a data warehouse and the design of fragments of the software system diagrams.

UDC 621.3.017

A5.44. Design of a computer-based electric “technical loss” control system on the basis of ORM/ERM. /G.Surguladze, N.Topuria, G.Bakhia/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 211–214. – Geo. res.: Geo, Eng, Rus.

A description of an automated design of databases for the personnel engaged in the power engineering sector, aimed at reducing “technical losses” in this sphere is presented. The design of a conceptual model is performed on the basis of the ORM diagram and corresponding ER model. The software of the user interfaces has been executed by means of ASP.NET

UDC 519.673

A5.45. Design of a simulation model of marketing processes on the basis of agent modeling. /M.Okhanashvili, L.Petriashvili/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 215–218. – Geo. res.: Geo, Eng, Rus.

The efficiency of application of simulation modeling for marketing processes is discussed, also the agent modeling not as a substitution of traditional approaches but as a useful supplement to system dynamics and discrete–stochastic modeling. A simple customer service system and the corresponding agent model are considered.

UDC 519.673

A5.46. A new approach to the technology of design of Internet-based data retrieval systems (after the example of www.e-info.ge). /T.Dolidze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 219–222. – Geo. res.: Geo, Eng, Rus.

A new approach to the design technology of Internet-based data retrieval systems is proposed enabling the user not only to get the address and product or service data searched but also to make a pilot analysis and assessment of the information.

UDC 519.673

A5.47. Virtual marketing modeling and distributor workstation. /M.Kashbadze/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 223–226. – Geo. res.: Geo, Eng, Rus.

The setting and solution of a problem of design of a distributor workstation in a network of virtual marketing on the basis of operative orders of would-be customers and an actual database of products from the corresponding trade catalogue are proposed. On the basis of the UML and Petri networks, the simulation system models and algorithms are designed.

UDC 519.673

A5.48. Integrated data analysis. /L.Petriashvili, M.Okhanashvili, Sh.Akhalaiia/. Transactions, Automated Control Systems. – 2007. – No.1(2). – pp. 227–230. – Geo. res.: Geo, Eng, Rus.

The development of ERP–systems, a role of the data warehouses in the information ERP–architecture and the prospects of design of the integrated media using the opportunities of these two technologies are considered. In addition, the estimation of achievements of two largest firms (SAP and People Soft), producers of the ERP–systems in the data warehouses and analytical applications development area.

B. NATURAL AND EXACT SCIENCES

B1. Mathematics. Mechanics. Physics. Cybernetics

UDC 669.02/09

B1.1. Analysis of dynamic effects in the piercing mill train with regard for joint gaps in its elements. /R.Adamia, S.Mebonia, T.Natriashvili/. Novation. – 2008. – No.2. – pp. 7–13. – Rus. res.: Geo, Rus, Eng.

Stages of the piercing mill train movement from the moment of switching on of the mill motor until the steady motion of the system given the gradual gaps locking in the main train elements are considered. The amplification factor values of the train are determined and the optimal region of the piercing mills ТПА 140 and 400, preventing inner resonance in the homer system of piercing mills is established.

UDC 531.8

B1.2. Optimization of the control system with the asynchronous electromechanical drive with the elastic linkage. /R.Adamia, N.Beradze, I.Dochviri/. Novation. – 2008. – No.2. – pp. 14–20. – Eng. res.: Geo, Rus, Eng.

The problems of optimization of transients of a drive with a feedback in the presence of digital control are considered. The optimum transfer functions and parameters are determined with the help of the so-called Bode diagrams. The work gives transfer functions with discrete operators both for open and closed loops. Using them, the optimized transient curves of the motor speed are constructed.

UDC 531.768

B1.3. Application of the principle of operation of accelerometer in non-conventional vibroimpact carriers. /Ts.Beradze, M.Tevzadze, D.Khuskivadze, N.Lomidze/. Novation. – 2008. – No.2. – pp. 21–27. – Geo. res.: Geo, Eng, Rus.

In a number of branches of national economy one of the effective means of radical improvement of traditional technological and working processes, in particular, increases of productivity and qualitative indicators, is the purposeful use of vibration in these processes. Vibration machines make it possible to perform a whole set of technological operations, the performance of which is generally impossible by means of traditional carriers. Since the accelerometer operation scheme has served as a basis for making a non-conventional vibroimpact carrier, the article presents the principle of its use. If a car is given the possibility of rolling with the produced acceleration and the disturbance pulse action assumes a continuous character, then the car will move with the desirable speed. To explain the rolling principle of a non-conventional vibroimpact carrier, the movement of cargo on a rough surface is considered. To produce the car rolling, it was necessary that the car wheel rolling in the vibrator shock direction would be free, whereas to ensure the same in the opposite direction, a free-wheeling clutch was used. A primitive scheme is considered and the sequence in which the phase trajectory is constructed is shown.

UDC 517.41

B1.4. Strictly increasing and strictly decreasing variate function. /K.Shvangiradze, D.Porchkhidze/. Novation. – 2008. – No.2. – pp. 28–32. – Geo. res.: Geo, Eng, Rus.

The development of a variate function density formula is given. It is shown that if $y = f(x)$ function is strictly increasing and continuously differentiated, it will have an inverse function $x = g(y)$ with continuous derivative, and if function $y = f(x)$ is strictly decreasing, the derivative of the inverse to it function $g'(y) \leq 0$, consequently $\psi(y) \geq 0$ and equality $\psi(y) = f[g(y)]|g'(y)|$ will be valid in both cases. A connection between probability distribution density $\psi(x)$ and $\varphi(y)$ is established. The equality $\psi(y) = f[g(y)]|g'(y)|$ is valid for intervals of possible values of variates X and Y , out of the intervals $\varphi(x) = 0$ and $\psi(y) = 0$. It is shown that if $y = f(x)$ function is piecewise strictly monotonous into the intervals of possible values of the variate X , this interval can be divided into n -partial intervals, in which every function $y = f(x)$ is strictly monotonous and densities $\psi_i (i = 1, 2, \dots, n)$ can be respectively found in each of these partial intervals according to the formula $\psi(y) = f[g(y)]|g'(y)|$.

UDC 681.61.061

B1.5. Pauli matrices and the theory of spatial rotations. /R.Adamia, A. Milnikov/. Novation. – 2008. – No.1. – pp. 7–12. – Eng res.: Geo, Rus, Eng.

It is shown that Pauli Matrixes can be derived from irreducible rotation group representations of the weight $l = \frac{1}{2}$, which in turn based on the theory of infinitesimal (elementary) spatial rotations. The last permits to substantiate why Pauli matrixes can be so sufficiently used for modeling of physical rotations.

B2. Chemistry. Biology

UDC 631.841.1/2

B2.1. Influence of ammonium nitrate introduction on glutamate dehydrogenase and glutamine synthetase activities and protein content in roots and leaves of maize. /I.Lomsianidze, T.Mitaishvili, M.Betsiashvili, V.Vashakmadze, N.Kuprava/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6, – No.3–4. – pp. 1–5. – Geo. res.: Geo, Eng, Rus.

Activities of the enzymes participating in ammonia assimilation – glutamine synthetase and glutamate dehydrogenase were studied in roots and leaves of maize against the background of fertilizing soil with rising doses of ammonium nitrate. The activity of enzymes as well as protein content changed in roots and leaves according to the doses of introduced ammonium nitrate.

UDC 582.783.2

B2.2. DNA microsatellite analysis of cultivated and wild Georgian grapes. /M.Gamkrelidze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6, – No.3–4. – pp. 6–10. – Eng. res.: Geo, Eng.

DNA microsatellite analysis of cultivated and wild Georgian grapes were studied. Seven Georgian cultivars: Rkatsiteli, Saperavi, Tavkveri, Goruli Mtsvane, Aleksandrouli, Chkhaveri and Ojaleshi were genotyped at six (VVS2, VVMD5, VVMD7, VVMD27, ssrVrZAG62, and ssrVrZAG79) polymorphic microsatellite loci and seven specimens of wild grape from different geographic zones of Georgia and one from Turkey were analyzed at four polymorphic microsatellite loci (VVMD7, VVMD27, VVS2, ZAG62). Phylogenetic tree of Georgian cultivars was constructed. Microsatellite analysis revealed high level of polymorphism among investigated cultivated and wild grapes detecting at the same time their individual, unique allelic profile. Extent of genetic polymorphism in wild accessions is slightly higher from that observed in cultural varieties.

UDC 663.958.8

B2.3. Novel plant composites as antioxidant food additives. /L.Gulua, N.Omiadze, N.Mchedlishvili, M.Abudidze, G.Tsiklauri, K.Jibladze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol. 6, – No.3–4. – pp. 11–15. – Eng. res.: Geo, Eng.

Content of polyphenols and soluble pectin in different fruits and vegetables as well as in green tea extract was determined. Two novel antioxidant composites from plant extracts were proposed as antioxidant food additives. One composite consisted of green tea extract and red wine lees, another composite included lemon peels extract in addition. The composite from green tea extract and red wine lees showed by 30% more antioxidant activity than the other composite.

UDC 581.524.2

B2.4. Invasion of *Centaurea solstitialis* L. in steppe vegetation of Tbilisi surroundings. /L.Khetsuriani, N.Lachashvili/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6, – No.3–4. – pp. 16–24. – Eng. res.: Geo, Eng.

The paper presents the results of a research on invasion specificities of a weed *Centaurea solstitialis* L. in steppe vegetation (Bothriochloeta; *B. ischaemum* and Festuceta; *F. valesiaca*) of Tbilisi surroundings. In steppe vegetation coenoses with sustainable (or slightly disturbed structure) the coenotic role of *C. solstitialis* is insignificant; its vitality is low: populations are represented by faded and weak individuals with poor renewal. In the structure-disturbed semi-ruderal coenoses the coenotic role of *C. solstitialis* is high (high projective coverage and frequency of occurrence). Its populations are represented by middle-sized and big (strongly branched) individuals with the ability to form a great number of heads. Their vitality is high. In steppe vegetation coenoses invasion of *C. solstitialis* is directly proportional to the disturbance of coenosis structure and soil erosion. The most important factor promoting the process is the human impact.

UDC 581.141/.142

B2.5. Morphogenesis and reproduction biology of *Muscari alpanicum* Schchian. /N.Melia, L.Gabedava, T.Barblishvili, L.Zghenti/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol. 6 – No.3–4. – pp. 25–29. – Eng. res.: Geo, Eng.

The structural aspects of reproduction biology, seed production processes and germination capacity have been studied in *Muscari alpanicum* Schchian – plant endemic to Georgia. High potential for sexual reproduction and high rate of full value seed formation have been established under conditions of outcrossing. The formation of both male and female generative spheres and reproductive activity are within the norm under conditions of outcrossing, and correspondingly great number of seeds having high germination capacity is produced. Autofertility of the studied plant was revealed, which is of facultative character and can be regarded as an auxiliary mechanism of seed formation under unfavorable environmental conditions.

UDC 581.141/.142

B2.6. Ex-situ conservation of some economically important relict plant species distributed in Georgia. /Ts.Mikatadze–Pantsulaia, M.Davlianidze, L.Kobakhidze, M.Eristavi/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6, – No.3–4. – pp. 30–37. – Eng. res.: Geo, Eng.

The paper presents the distribution ranges of economically important relict plant species: *Gymnospermium smirnowii* (Trautv.) Takht. (Berberidaceae); *Hibiscus ponticus* Rupr. (Malvaceae); *Kosteletzkya pentacarpa* (L.) Ledeb (Malvaceae); *Paeonia steveniana* Kem.–Nath. (Paeoniaceae); *Pancratium maritimum* L. (Amaryllidaceae) and *Trapa colchica* Albov (Trapaceae) within the territory of Georgia. As a result of investigations, GIS-based distribution maps are produced, the present state of populations is estimated, and the capacity for propagation by seeds is evaluated for each of these relict plant species. Our investigations have revealed high vitality and fertility of the studied species and quite good potential for self-renewal expressed in high rates of seed germination and seedling growth. In our opinion, the environmental conditions (anthropogenic impact, zoo-factor, habitat degradation, etc.) are considered to be the main factors responsible for the reduction of population number of these species. Works are undertaken for ex-situ conservation of species under investigation: seed bank and collection of seedlings are created.

UDC 631.425.22

B2.7. Microflora of some soil types in Samegrelo region. /I.Buliskeria, Z.Lomtatidze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 39–42. – Eng. res.: Geo, Eng.

The general number and peculiarities of distribution of separate groups of microorganisms in alluvial calcareous, alluvial-saturated, alluvial-acid and subtropical grey soils of the Samegrelo region have been studied. It has been established that according to the number of microorganisms, alluvial calcareous soil type has the highest index (822.3x10⁵), while their number in the alluvial-saturated, alluvial-acid and subtropical grey soils are comparatively small – 606.0x10⁵, 218.0x10⁵, 480.0x10⁵ cells, respectively (per 1 g of dry soil). The distribution of actinomycete-antagonists was also investigated in those soils.

UDC 57.063.8

B2.8. The potential of 2,4,6-trinitrotoluene application by bacteria as the sole source of carbon and nitrogen. /N.Gagelidze, L.Amiranashvili, Kh.Varsimashvili, L.Tinikashvili, L.Zuroshvili, E.Kirtadze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 43–49. – Eng. res.: Geo, Eng.

To reveal the potential of 2,4,6-trinitrotoluene (TNT) application as the sole source of carbon and nitrogen, 40 bacteria isolated from contaminated soils of Georgia and 12 strains of genera *Rhodococcus* and *Mycobacterium* kept in the collection of microorganisms at Durmishidze Institute of Biochemistry and Biotechnology have been investigated. All tested strains grew better on TNT-containing media in the presence of rapidly assimilated sources of carbon and nitrogen. Some of them grew better on TNT-containing nutrient media in the presence of carbon sources and others – in the presence of nitrogen sources. The growth intensities of all strains were suppressed when TNT was used as the sole source of both elements. At deep cultivation the utilization of TNT in case of *Pseudomonas* sp.44 and *Rhodococcus* sp. VCM Ac 1170 str.44 was most intensive on complete nutrient media (89% and 67%, respectively); however, the process also occurred in the media, in which TNT was the sole source of carbon and nitrogen. In these variants the amount of residual TNT was 33–42%.

UDC 579:502.654

B2.9. The microorganisms participating in oligocarbohylic and humus mineralization of Shida Kartli soils. /I.Gorozia, Z.Lomtadze, N.Kotia, I.Buliskeria., N.Lomtadze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 50–52. – Eng. res.: Geo, Eng.

The quantitative and qualitative content of the microorganisms participating in oligocarbohylic and humus mineralization of different soil types in Shida Kartli have been determined. It has been established that the samples of the given soils are distinguished by the amount of investigated microorganisms. The cinnamonic calcareous soil type is rich in oligocarbohylic microorganisms (the amount of microorganisms – $574 \times 10^3 \pm 1\%$), relatively poor are cinnamonic leached, alluvial–calcareous and meadow cinnamonic soil types (the amount of microorganisms – $52 \times 10^3 \pm 1\%$, $69 \times 10^3 \pm 1\%$ and $67 \times 10^3 \pm 1\%$, respectively). It has been also established that the microorganisms of *Nocardia* family dominate.

UDC 579.87

B2.10. Screening of extremophilic actinomycetes – destructors of hydrocarbons and pesticide 2,4-dichlorophenoxyacetic acid. /M.Gurielidze, T.Berishvili, N.Cholokava, D.Pataraya, N.Nutsubidze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 53–57. – Eng. res.: Geo, Eng.

Detoxification capability of 403 strains of extremophilic actinomycetes isolated from various soil types of Georgia to hydrocarbon (hexane, benzene, benzopyrene, naphthalene, crude oil) and pesticide 2,4-dichlorophenoxyacetic acid has been studied. The following actinomycetes have been selected: 26 – hexane, 28 – benzene, 3 – crude oil, 19 – benzopyrene and 37 – naphthalene destructor strains among halophilic actinomycetes and 25 – benzopyrene, 31 – dichlorobenzene, 15 – naphthalene, 9 – hexane and 7 benzene destructing strains among alkaliphilic actinomycetes. Almost all 97 investigated strains of thermophilic actinomycetes exhibit the hydrocarbons transformation ability. From 2,4-destructor strains 64 – halophilic, 10 alkaliphilic active strains have been selected; no active strain has been established among thermophiles.

UDC 547.455.522

B2.11. Influence of iron ions on the poly (ADP-ribose) polymerase and DNA topoisomerase II activities of eukaryotic cells. /G.Zaalishvili, D.Margiani, I.Gabriadze, K.Kutalia, K.Kolkhidashvili, T.Zaalishvili/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 58–61. – Eng. res.: Geo, Eng.

The influence of iron salts on the rat brain and liver cell nuclear poly (ADP-ribose) polymerase and nuclear matrix DNA topoisomerase II activities has been studied. The inhibition of both poly (ADP-ribose) polymerase and topoisomerase II activities by Fe^{2+} and Fe^{3+} ions has been shown. It is supposed that iron ions can inhibit nuclear poly (ADP-ribose) polymerase activity not only by affecting nucleoprotein system but also by participating in the formation of such complexes with the substrate of poly(ADP-ribose) polymerase (NAD), which are not convertible by the enzyme.

UDC 582.28

B2.12. Contribution to the mycobiotic diversity of Georgia: fungi associated with myricaria Germanica (L.) Desv. /M.Gvritishvili, K.Kacheishvili–Tavartkiladze, M.Churgulia–Shurgaia/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 62–64. – Eng. res.: Geo, Eng.

16 species of microfungi associated with *Myricaria Germanica* in Georgia are briefly reviewed. Among them *Diplodia tamaricina* and *Phomopsis myricariae* are new records to Georgia and other species listed are a new fungus–host combination.

UDC 563.12

B2.13. Foraminifers and palynomorphs in the Sarmatian deposits of Kartli (Eastern Georgia): stratigraphical and palaeoclimatological implications. /I.Shatilova, L.Maissuradze, K.Koiava, N.Mchedlishvili, L.Rukhadze, S.Spezzaferri, A.Strasser/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. No.3–4. – pp. 65–76. – Eng. res.: Geo, Eng.

The foraminifers and palynomorphs from Sarmatian deposits of two sections, Nadarbazevi and Uplistsikhe, were studied. The foraminiferal assemblages allow establishing Late Volkhynian (beds with *Elphidium aculeatum*) and Early–Middle Bessarabian (beds with *Affinetrina voloshinovae* and *Porosononion aragviensis*) ages. The palynological analysis reflects the changes of ecological–systematical composition of the flora and allows interpreting the evolution of vegetation on the territory of Kartli depending on climatic fluctuations.

UDC 632.15

B2.14. Adaptive potentials of *Artemisia* L. species to heavy metal contamination depending on their habitats. /E.Alirzayeva, T.Shirvani, G.Babayeva, V.Ali-Zade/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol. 6. – No. 3–4. – pp. 77–81. – Eng. res.: Geo, Eng.

Adaptive possibilities and heavy metal (HM) accumulating capacity of two indigenous dominant *Artemisia* L. species (*A.fragrans* and *A.szovitsiana*) widespread on different contaminated locations of Azerbaijan with various soil pollution levels has been studied. The contents of Cd, Cu, Ni, Pb and Zn in plant parts and surrounding soil samples were determined. Tested *Artemisia* species displayed the distinctive strategies of toleration to HM levels in their environment. They proved as tolerant, accumulator and indicator plants depending on their habitats. Due to high resistance to various soil contaminations they could be recommended for use in natural long–term restoration of stressed soils.

UDC 633.685

B2.15. Insecticidal properties of mannose–binding lectin from *dioscorea batatas* tubers. /M.Gaidamashvili, Y.Ohizumi, T.Ogawa, K.Muramoto/. Proceedings of the Georgian Academy of Sciences. – 2008. – V. 6. – # 3–4. – pp. 82–87. – Eng. res.: Geo, Eng.

Mannose–binding lectin DB1 from *Dioscorea batatas* tubers was examined for insecticidal activity against *Helicoverpa armigera* and *Helicoverpa assulta* (Lepidoptera: Noctuidae) larvae at different stages of development. The rate of adults successfully emerging from pupae fed on DB1 was 33% when incorporated into artificial diet at the rate 0.01% (w/w). DB1 had no, or revealed marginal inhibitory effects on gut proteolytic and hydrolytic enzymes measured by FITC assay. The results show that mannose–binding lectin DB1 from *Dioscorea batatas* may fulfill defense role against insect pests.

UDC 548.736.443.2

B2.16. The genetic effect of lead nitrate on *Allium cepa* at the early stage of ontogenesis. /G.Shevardnadze, K.Goginashvili, Sh.Sharia, L.Shalikashvili/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No.3–4. – pp. 88–90. – Eng. res.: Geo, Eng.

Short–term (24 hours) and prolonged (240 hours) genetic effects of lead nitrate have been studied in *Allium cepa* at an early stage of ontogenesis. Examination of different doses (0.001M, 0.01M and 0.1M) of the compound revealed mutagenic activity of all the tested doses. In addition, the highest dose was cytotoxic and induced extremely high level of chromosome aberrations leading to the death of the plant within 2–3 weeks after sprouting.

UDC 567.556.1

B2.17. *Enchodelus muchuriensis* n sp. (Nematoda, Dorylaimida) from Western Georgia. /N.Bagathuria, M.Kuchava, N.Chuchulashvili/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. – No. 3–4. – pp. 91–93. – Eng. res.: Geo, Eng.

The paper deals with the description of the new species *Enchodelus muchuriensis* n. sp. (Nematoda, Dorylaimida) from Western Georgia. Its measurements, differential diagnosis and original pictures are given.

UDC 599.74

B2.18. Spreading of nematodes in the predatory mammals of Imereti region (Western Georgia). /E.Gordadze, Ts.Zhorzholiani/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6, – No. 3–4. – pp. 94–97. – Eng. res.: Geo, Eng.

Helminthofauna of predatory mammals of Imereti region was studied. It was found that 11 species of predatory mammals in Imereti region are characterized of their own, specific helminthofauna from Nematode class. 63.18% of the investigated animals turned out to be infested. 25 species of parasitic nematodes were found in the studied predatory mammals.

UDC 616-002.912.283

B2.19. Case of cestode invasion of African rock python (*Python Sebae* Gmelin, 1788) in Tbilisi Zoo. /L.Murvanidze, Ts.Lomidze, K.Nikolaishvili, N.Vachnadze/. Proceedings of the Georgian Academy of Sciences. – 2008. – vol.6. No.3–4. – pp. 97–100. – Eng. res.: Geo, Eng.

The paper deals with the morphological description of *Cestoda* found in the small intestine of the African rock python (*Python sebae*) delivered from Tanzania a month after being deceased. According to the scolex structure, the helminth belonged to the inferior cestodes of the order *Pseudophyllidea*, family *Bothriocephalidae*.

UDC 547.571

B2.20. Infrared absorption spectra and biological characteristics of benzoyl hydrazone with benzaldehyde and coordination compounds of some metals with benzoyl hydrazone of benzaldehyd. /G.Tsintsadze, T.Giorgadze, T.Tsintsadze, I.Gvelesiani, L.Skhirtladze, E.Topuria/. Georgian Chemical Journal. – 2008. – vol. 2. – No.2 – pp. 109–111. – Geo. res.: Eng. Rus.

A spectral study of synthetic coordination compounds of $MCl_2 \cdot L_2 \cdot mH_2O$ (where M = Co (II), Ni (II), Cu (II), Zn, Mg, Ca, Ba) composition has been conducted. The influence of BHBA on the development of some microorganisms has been studied.

UDC 547.826/.827

B2.21. Synthesis, structure and properties of arsenic, stibium and bismuth bio-coordinative admixtures with carbonate acid amides. /T.Tsivtsivadze, N.Chigogidze, R.Skhiladze, R.Kldiashvili, G.Sulakvelidze/. Georgian Chemical Journal. – 2008. – vol.2. – No. 2 – pp. 112–122. – Geo. res.: Eng, Rus.

The latest methodology of synthesis of arsenic, stibium and bismuth bio-complex admixtures with pyridine carbonate acid (picoline, nicotine and isonicotinic acids) amides is worked out and by using absolute ethanol as a solvent (by adding some drops of concentrated hydrochloric acid or nitric acid and heat-ing), 27 new bioactive substances are extracted in a solid state with the total structure: $MX(L)_n \cdot (C_2H_5OH)_m$, where M = As(III), Sb(III), Bi(III), X = F, Cl, Br, I; L = PkA (Picoline Acid Amide), NkA (Nicotine Acid Amide), InkA (Isonicotinic Acid Amide); n = 1, 2, 3; m = 1, 2. The methods of purification and preparation for synthesis of initial substances, particularly of arsenic, stibium and bismuth salts – halides (fluorine, chlorine, bromine, iodine, nicotine, isonicotinic acids) amides, solvent selection, purification and water disposal, optimum conditions for extraction of synthesized complex admixtures, results obtained from studying chemical composition, individuality, colour, solubility in different solvents, melting point, thermal resistance and molecular structure by means of modern physical and chemical methods are proposed. The influence of metal-complex-producing acid and organic ligands, the conditions of carrying out synthesis on types of coordination in complexes, on revealing and defining correlation in the fundamental problem “substance content-structure-property” on the content and structure is determined, which substantially facilitates the planning and purposeful maintenance of synthesis and obtaining bio-complex admixtures with properties predicted beforehand.

UDC 678.742.3:678.045.2

B2.22. Nitrogen containing hindered phenols – inhibitors of thermo-oxidation of polypropylene. /N.Yusubov, M.Mamedov, R.Kasimov, Y.Markova, N.Janibayov/. Georgian Chemical Journal. – 2008. – vol.2. – No. 2. – pp. 123–126. – Rus. res.: Geo, Eng.

Some nitrogen-containing steric hindered phenols (Mannix bases) have been synthesized. Among the synthesized compounds, aminomethylphenols having 2,6-ditertbutyl radicals reveal the highest activity against thermo-oxidation of propylene.

UDC 678-13

B2.23. Quantum-chemical values of relative reactivity of dimethylthienylvinylsilane and dithienylmethylvinylsilane in reactions of copolymerization with methylmetakrilate. /N.Kupatadze, O.Mukbaniani, E.Marcarashvili, L.Kalatozishvili/. Georgian Chemical Journal. – 2008. – vol.2. – No.2 – pp. 131–134. – Geo. res.: Eng, Rus.

In recent years, besides experimental searches, all relative reactivity of monomers which participate in reactions of copolymerisation, great attention is paid to their quantum-chemical calculation with a view to establish parameter values of reactivity. On the basis of a quantum-chemical research of molecules of methylmetakrilate (MMA) dimethylthienylvinilsilane (DMTVS) and dithienylmethylvinilsilane (DTMVS), as well as their excited states and simplified α -radicals, a sequence of their activity in chemical reactions has been determined: DMTVS < DTMVS < MMA that is proved by comparing them with the experimental data.

UDC 547.455.623

B2.24. Synthesis of sugar derivatives. /R.Gakhokidze, L.Tabatadze, M.Tatarishvili, N.Sidamonidze, N.Pirveli/. Georgian Chemical Journal. – 2008. – vol. 2. – No. 2. – pp. 135–139. – Geo. res.: Eng, Rus.

By interaction of allylderivatives of monosaccharides and disaccharides (glucose, galactose, maltose, lactose) with phenylsulfochlorides and ethyl-2-bromopropanoate are obtained: 2,3,4,6-tetra-O-acetyl-D-glucopiranosyl-2-methyl-4-bromopentanoate; ethyl β -O-2,3,4,6-tetra-O-acetyl-D-galactopiranosyl-2-methyl-4-bromopentanoate; hepta-O-acetyl-1-O-(α -methyl- γ -bromvalerat)- β -D-maltose, hepta-O-acetyl-1-O-(α -methyl- γ -bromvalerat)- β -D-lactose and 2,3,4,6-tetra-O-acetyl-1-O-(2-chloro-3-phenylthiopropyl)- β -D-glu-copiranosyl; 2,3,4,6-tetra-O-acetyl-1-O-(2-chloro-3-phenylthiopropyl)- β -D-galactopiranosyl; hepta-O-acetyl-1-O-(2-chloro-3-phenylthiopropyl)- β -D-maltose; hepta-O-acetyl-1-O-(2-chloro-3-phenylthiopropyl)- β -D-lactose.

UDC 547.592.3

B2.25. Modeling of cyclohexane hydrocarbons dehydroalkylation process over modified pentasyls. /F.Veliyeva/. Georgian Chemical Journal. – 2008. – vol.2. – No. 2 – pp. 140–143. – Rus. res.: Geo, Eng.

The article presents the results of a study of kinetic regularities of cyclohexane hydrocarbons dehydroalkylation reaction over pentasyl modified with platinum and gallium in the presence of O₂ and CO₂ mixture. The reaction mechanism has been considered and the numerical values of thermal effects stages have been found. The constructed mathematical model has been used for studying the reactor with fluidized bed of catalyst.

UDC 666.1/28

B2.26. Some peculiarities of glasses and silicates in the systems of complex materials. /A.Sarukhanishvili, E.Matsaberidze, M.Kapanadze, M.Mshvildadze/. Georgian Chemical Journal. – 2008. – vol.2. – No.2 – pp. 144–147. – Rus. res.: Geo, Eng.

The work provides some suggestions on the mixture composition influence on silicate formation, receiving melt “microphase” composition and products of its super-cooling (glass). It is supposed that the introduction of a complex material into the mixture, besides the improvement of technico-economic indexes of glass production, gives the glass a structure which differs from traditional materials containing base production glass structure, on condition that the oxide composition of glass stays unchanged.

UDC 553.32

B2.27. Manganese oxide catalysts-adsorbents for gas cleaning from hydrogen sulfide. /V.Bakhtadze, V.Mosidze, R.Janjgava, D.Kartvelishvili, N.Chochishvili, N.Kharabadze, M.Pajishvili/. Georgian Chemical Journal. – 2008. – vol.2. – No.2. – pp. 148–150. – Rus. res.: Geo, Eng.

Manganese tabletted catalysts-adsorbents have been elaborated for cleaning hydrocarbon gases from H₂S based on the concentrates of manganese natural ores. It was demonstrated that manganese catalyst-adsorbents, by their activity, capability for absorption of H₂S, and by technological regime of operation, are highly competitive with industrial zinc absorbers of some type and have better characteristics in terms of mechanical strength and thermal stability.

UDC 669.046.564.7

B2.28. Investigation of astoichiometric compound combinations influence on catalytic reactivity of a decationized sample of clinoptilolite. /T.Kekelia, A.Mskhiladze, T.Kheladze, N.Takaishvili, Sh.Sidamonidze/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 151–154. – Geo. res.: Eng, Rus.

Influence of astoichiometric compound combinations on the catalytic reactivity of a maximally decationized sample of natural clinoptilolite has been investigated in relation with the model reaction of ethanol dehydration. The activity of catalyst is found to increase upon use of the CO+NO₂ or CO+CO₂ combination, but it is less than the activity received by addition of only CO₂, and especially by addition of single NO₂. It should be mentioned that dehydration of ethanol is carried out by strong B-centers, but intermole-cular dehydration is conducted by both B and L-centers, also by Fe³⁺ ions migrated to positions M₁.

UDC 665.525

B2.29. Study of fractional composition of Samgori and Supsa oils (Georgia) by method of gas-chromatography. /G.Areshidze, M.Tolordava, S.Shengelya, M.Gajiev-Shengelya/. Georgian Chemical Journal. – 2008. – v.2. – #2. – pp. 155–156. – Geo. res.: Eng, Rus.

The imitational distillation (SimDis) of Samgori and Supsa (Well #42) oils is completed according to the US standard ASTM 2887–93.

UDC 541.124

B2.30. Kinetics and mechanism of the reaction proceeding in o-aminophenol-bromate-vanadium (V) indicator system. /T.Dadianidze, N.Dzotsenidze, Al.Dadianidze, G.Kutateladze/. Georgian Chemical Journal. – 2008. – v.2. – #2. – pp. 157–160. – Geo. res.: Eng, Rus.

The indicator reaction of oxidation of o-aminophenol with bromate is used to determine micro-quantities of vanadium (V) by a kinetic method. Optimal conditions are established. Protonated 3-amino-phenoxazon-2 is identified as a result product of the reaction of oxidation. The mechanism of the reaction has been suggested. Experimental data obtained proved the formation of peroxyvanadate in the reaction under optimal conditions. The catalyst plays the role of a coordinator. Taking into account the mechanism of the reaction and protolytic quasi-equilibrium existing in the system, the kinetics equation has been offered. Based on this equation and the experimental data obtained, the value of dissociation constant of peroxyvana-date is calculated. The value calculated is in agreement with the value determined spectrophotometrically and with literary data for similar complexes.

UDC 547.477.1

B2.31. Quantum-chemical study of 2-hydroxy-1,2,3-propanetricarboxylic acid (citric acid) reactivity. /G.Tsintsadze, T.Tsivtsivadze, M.Tsintsadze, M.Gogaladze, D.Lochoshvili, I.Beshkenadze, I.Gvelesiani, J.Kereselidze/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 161–164. – Geo. res.: Eng, Rus.

By a semi-empirical AM1 method, the heat of formation of citric acid (H_3L) as well as an interatomic distances, bond orders, valence angles, effective atomic charges, electron densities, electron populations on atomic orbitals etc. have been calculated. The capabilities of coordination of the molecule with a metal-complex former have been determined.

UDC 66.094.492

B2.32. IR spectra study of the complexes formed with nickel rhodanines. /N.Mgaloblishvili, N.Telya, G.Tsintsadze/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 165–167. – Geo. res.: Eng, Rus.

The structure of the complexes formed by rhodanine derivatives with nickel (II) has been studied for the first time by the spectroscopic and quantum-chemical semi-empirical AM1 methods. It has been demonstrated that the rhodanines derivatives with nickel coordinate via one of the nitrogen atoms of the oxygen of carboxyl groups and azo-group of their molecules, presumably, via N(7). As the ratio of the reacting components in complex compounds is Ni:L=1:2, their structure is presented as octahedral $Ni(O,N,O)_2$, with the nickel coordination number of six.

UDC 547.466

B2.33. Theoretical investigation of amino acids within the scope of quasi-ANB-matrices method. /M.Gverdtsiteli, M.Bedinashvili, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – v.2. – #2 – p.168. – Geo. res.: Eng, Rus.

A theoretical investigation of correlations “structure – properties” has been carried out for amino acids within the scope of quasi-ANB-matrices method. Correlations are satisfactory.

UDC 547.94

B2.34. Theoretical investigation of unbranched alcohols within the scope of pseudo-ANB-matrices method. /M.Gverdtsiteli, G.Otinashvili, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – v.2. – #2 – p.169. – Rus. res.: Geo, Eng.

Correlations “structure-properties” are studied for unbranched alcohols within the scope of the pseudo-ANB- matrices method. Calculations show that correlations are satisfactory.

UDC 547.472.2

B2.35. Theoretical investigation of correlations “structure – properties” for β,Ω -glycols within the scope of quasi-ANB-matrices method. /M.Gverdtsiteli, N.Kupatadze, E.Markarashvili, M.Gverdtsiteli/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 170–171. – Eng. res.: Geo, Rus.

Correlation equations were constructed and studied for β,ω -glycols within the scope of quasi-ANB-matrices Method. Calculation show that correlations are “good”.

UDC 633.525.2

B2.36. Standardization of roots of dead-nettle digamous (*Urtica dioica* L.). /P.Iavich, L.Churadze, T.Rukhadze, N.Gagua, N.Kavtaradze, M.Getia/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 172–173. – Geo. res.: Eng, Rus.

Methods of standardization of roots of dead-nettle growing in Georgia have been elaborated. In consequence of demands of the State Pharmacopoeia of Georgia the following tests were used: quantitative reactions, arithmetical indicators, quantitative analysis. The obtained data allow to characterize the quality of used feedstock (botanical). Results of the quantitative definition are confirmed by the method of addition and metrological characterization.

UDC 616.31

B2.37. Technological and biopharmaceutical investigation of stomatological medicinal ointments. /P.Yavich, M.Javakhia, E.Gasviani, T.Rukhadze/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 174–175. – Rus. res.: Geo, Eng.

A recipe and technology of preparation of stomatological ointments containing water and mineral mud „Akhtala” have been elaborated. A number of biopharmaceutical investigations confirming the possible medicinal activity of the ointments are carried out. The conclusion about the possibility of their application in stomatological practice is made.

UDC 667.274.1

B2.38. Investigation of the walnut (*Juglans regia*) leaves extraction process. /K.Goletiani, G.Tsagareishvili/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 176–177. – Rus. res.: Geo, Eng.

The walnut leaves extraction process has been studied in terms of dependence on ethanol concentration, phase ratio, and extraction temperature. The optimal parameters of the extraction process have been established.

UDC 615.451.16

B2.39. Elaboration of complex remedies based on Tikha–askane and walnut leaves extract. /G.Tsagareishvili, K.Goletiani, P.Iavich/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 178–180. – Rus. res.: Geo, Eng.

Prescription and technological process for the obtaining of suspension on the basis of Tikha–askane and walnut leaves extract have been worked out. Colloidal stability, rheological properties, and liberation (diffusion VS semi-permeable membrane into agar gel) have been studied. The said suspension has been found to meet all the appropriate requirements.

UDC 634.747

B2.40. Physico–chemical characteristics and aminoacid composition of an elder grassy (*Sambucus edulus* L.) berries juice. /V.Khvedelidze, G.Gorgodze, M.Bakhtadze, V.Kvantidze, L.Berekashvili/. Georgian Chemical Journal. – 2008. – v.2. – #2. – pp. 181–183. – Rus. res.: Geo, Eng.

The physico–chemical indicators and the presence of aminoacid in the juice of the elder–berry grown in the Tskaltsitela gorge (West Georgia) and in downwards of the river Rioni have been established. It is shown that it is rich in macro– and microelements, organic acids, ascorbic acid and irreplaceable aminoacids. The consistence of aminoacids is partly diminished because of the ultrafiltration.

UDC 678.048

B2.41. Chemical study of the collection of antioxidant active plants. /V.Khositashvili, L.Khositashvili, N.Mindiashvili, G.Chakhunashvili, M.Sutiashvili/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 184–185. – Geo. res.: Eng, Rus.

It is ascertained that equal amount of parts of some medicinal plants in Georgia is characterized of a considerable content of the phenolic collection (not less then 1.2%). It is characterized of high antioxidant activity.

UDC 665.75

B2.42. Unconventional ways of fuel production and their impact on the environment. /N.Khetsuriani, K.Goderdzishvili, E.Topuria, G.Shavgulidze, M.Chkhaidze/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 186–189. – Rus. res.: Geo, Eng.

Modern methods of liquid motor fuel production from raw organic materials as an alternative to petroleum (coal, plant biomass and syn–gas) are considered. The data on the properties and application of different alternative liquid fuels are given.

UDC 628.16

B2.43. On the problem of arsenic (V) removal from water. /T.Iashvili, G.Jincharadze, N.Bokuchava, D.Jincharadze, N.Gamkharashvili/. Georgian Chemical Journal. – 2008. – v.2. – #2 – pp. 192–195. – Rus. res.: Geo, Eng.

For the removal of arsenic from water some coagulants have been tested. A quantity of the substance which improves the hydrolysis process of the coagulant has been selected. The best filtering material and speed of filtration have been determined as well as the method of regeneration of the filtering material. The rational procedure for the removal of arsenic has been developed, where aluminum sulphate is used as a coagulant. The ratio of arsenic removal reaches 95–96%.

UDC 546.712/.717

B2.44. Application of ozone for obtaining manganese dioxide. /T.Chkonia, T.Maslentsova, B.Purtseladze, E.Shoshiashvili, I.Chkhaidze, M.Svanidze/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp.13–17. – Rus. res.: Geo, Eng.

The article deals with the data on working out of a manganese dioxide obtaining technology through oxidation of $Mn(NO_3)_2$ by adding ozone to the solution. The product obtained under given conditions shows high electrochemical activity. Ref. 6, Tab. 3.

UDC 678.744.428

B2.45. Capacitive behavior of manganese dioxide films prepared by anodic deposition in the presence of chromate ion and polyvinyl spirit for super condenser. /G.Tsagareli, E.Kachibaia, S.Machatadze, R.Imnadze, T.Paikidze/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 31–34. – Rus. res.: Geo, Eng.

The hydrous manganese dioxide thin films were deposited on the platinum plate anode from the solution containing 0,002 mol/l $MnSO_4$, 0,02 mol/l $(NH_4)_2CrO_4$ and 1 g/l polyvinyl alcohol. Cyclic voltammograms were measured in 0,5 mol/l Na_2SO_4 at a scan rate of 50 mV/s between 0,1 V and 0,9 V (Ag/AgCl). The initial specific capacitance estimated from the voltammetric data was 370 F/g and this volume decreased by 15% after 400 cycles. The polyvinyl alcohol addition to plating solution significantly increased reversibility and improved cyclic voltammograms shape. Thus, the manganese dioxide thin films were found to be promising electrode material for electrochemical supercapacitor. Ref. 6, Fig. 3.

UDC 66.049.6

B2.46. Definition of the exponent in the kinetic equation of growth of volatile scale. /I.Nakhutrishvili/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol. 34. – #1. – p.53–58. – Rus. res.: Geo, Eng.

Formal kinetics of partially volatile scale growth has been considered. An expression for the exponent in the corresponding kinetic equation has been found. Abs. 3, Fig. 3.

UDC 549.67

B2.47. Water-sorption capacity of some natural zeolites from Georgian deposits. /T.Kordzarhia, M.Burjanadze, M.Dzagania/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 62–67. – Rus. res.: Geo, Eng.

The advantage of zeolites' use in the desiccation process of objects with low-moisture content as compared with other adsorbents has been shown. The adsorption property and maximum capacity of different zeolite-bearing rocks of Georgian deposits in relation to water vapor have been studied by the methods of desiccative and thermal analysis. It has been shown that the cation-exchange modification of clinoptilolite-bearing rocks has a negligible effect on the adsorption property of these adsorbents in relation to water. It has been found that phillipsite-bearing rocks are characterized of the best adsorption property in relation to water.

UDC 62-404.5

B2.48. Investigation of the mechanism of solid solution creation process in the system $Li_2O \cdot XFe_2O_3$. D.Lanchava, M.Khundadze, T.Machaladze, N.Lezhava/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 71–75. – Rus. res.: Geo, Eng.

Analysis of the investigation results and their comparison to the literary data gives the basis to assume the mechanism of ferrite creation process as the consecutive stages of transformations under conditions of synthesis: (1) primary formation of lithium orthoferrite – $LiFeO_2$ from the charge ($Li_2CO_3 + Fe_2O_3$); (2) decay of $LiFeO_2$ into thermodynamically steadier phase $LiFe_5O_8$ and Li_2O under conditions of synthesis (the presence of surplus Fe_2O_3 and oxygen area) by the scheme: $5LiFeO_2 = LiFe_5O_8 + 2Li_2O$; (3) dissolution of Li_2O in $LiFe_5O_8$ and formation of solid solution with the general formula $LiFe_xO_{2+1,5(x-1)}$ $x=2,3,4,5$. This type of dissolution can be compared to the case of isodimorphic mixing of different structures with a changing number of atoms in a solid solution. To this promotes the distinctive for $LiFe_5O_8$ super-structural ordering in octahedral sub-lattice. This case can be compared with the well-

investigated system $\text{LiCl} - \text{MgCl}_2$, where the stratum ordering of ions Mg^{2+} and vacancies is supposed, and thus, the structure and some properties of solid solution gets features of structure of MgCl_2 . In our case, we have spinel structure for all compositions and the same critical points of phase transformations ($T_K - 620^\circ\text{C}$ and $T_{tr} - 720^\circ\text{C}$). Since the compositions $\text{Li}_2\text{O} \cdot x\text{Fe}_2\text{O}_3$ ($x = 2, 3, 4, 5$) have crystal structure of spinel, for revealing the true character of dependence of enthalpy of transformations ΔH_{tr} on composition, it is necessary to reduce their formula to the uniform 7-atomic unit: $\text{Li}_{1,08}\text{Fe}_{2,15}\text{O}_{3,77}$ ($x=2$), $\text{Li}_{0,79}\text{Fe}_{2,33}\text{O}_{3,88}$ ($x=3$), $\text{Li}_{0,69}\text{Fe}_{2,46}\text{O}_{3,95}$ ($x=4$), $\text{Li}_{0,5}\text{Fe}_{2,5}\text{O}_4$ ($x=5$). It is obvious that we deal with solid solutions of non-stoichiometric structures with oxygen deficiency which gradually decreases from $x=2$ (aside growth x) and only at $x=5$ the stoichiometry is reached. The results of calorimetric investigations (HT-1500 Setaram) are represented as corresponding tables and graphs. Abs. 4, Tab. 1, Fig. 2.

UDC 661.834

B2.49. Synthesis, phase composition and structure characteristics of $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ spinels as 5V cathode materials for Li-ION accumulators. /E.Kachibaia, R.Imnadze, T.Paikidze, R.Achvlediani/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 76–79. – Rus. res.: Geo, Eng.

$\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ samples as cathode materials for Li-ion accumulators were synthesized through various methods. According to physical and chemical studies, the solid state high temperature method as well as the comparatively low temperature melt-impregnation method do not provide for the formation of phase-pure $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ compounds with spinel structure. In addition to the spinel phase, the hexagonal phase with $a = 2.886\text{Å}$ and $c = 14.28\text{Å}$ is fixed in the samples that leads to low capacity and emergence of 4V plateau. High dispersal phase-pure samples of $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ obtained through sol-gel as well as through a method simpler than the former one (without using complex formation agent) will attract interest as 5V cathode materials for lithium-ion accumulators.

UDC 543

B2.50. Quantum-chemical description of regioselectivity of connection to asymmetrical ethylene bond. /T.Zarkua, J.Kereselidze, Z.Pachulia/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 80–82. – Rus. res.: Geo, Eng.

Regioselectivity of reaction of the HBr connection to asymmetrical ethylene bond is quantitatively described on the basis of enthalpy of activation ($\Delta\Delta H^\ddagger$) and heat of reaction ($\Delta\Delta H$) values calculated by means of a quantum-chemical semiempirical AM1 method. It is concluded that the formation 2Br-pentane is energetically more favourable. Abs. 3, Fig. 2.

UDC 678.763.2

B2.51. Determination of net compactness for structured polychloroprene rubbers. /M.Shalamberidze, Z.Kopaladze, N.Lomtadze/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 88–90. – Rus. res.: Geo, Eng.

The solidification process of latent and polyisocyanate solidified structured polychloroprene rubbers Nairit-DKT-80 and Nairit-HT has been investigated in dimethylformamide and toluene. The physical parameters of a network for the structured polychloroprene rubbers are given.

UDC 621.315.592

B2.52. Electroconductivity of glass host matrix with embedded CuCl quantum dots. /R.Janelidze, M.Kaziashvili, O.Bakradze, V.Edilashvili/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – #1. – pp. 91–94. – Rus. res.: Geo, Eng.

The electroconductivity of glass matrix samples doped with CuCl quantum dots of different radii has been measured and the relation between the value of conductivity and quantum dot radius has been investigated. It is shown that the larger the matrix radius, the smaller is its conductivity. This fact can be explained by exclusion of ions incorporated in the quantum dots from the charge transport process.

UDC 631.4:633.11

B2.53. Influence of synthetic zeolite on wheat seed germination. /L.Eprikashvili, M.Zautashvili, M.Dzaganian, N.Pirtskhalava, N.Burkiashvili/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – No.1. – pp. 103–106. – Rus. res.: Geo, Eng.

Effects of the soil enriched with laumontite-bearing rocks and the synthetic zeolite CaA on the germination of winter wheat seeds in the laboratory environment have been studied. It has been established that the synthetic zeolite CaA effects seed germination and the height of sprout of wheat plant to a greater extent than the laumontite-bearing rocks, the fact being apparently related to the structural features of the synthetic zeolites.

UDC 543.226

B2.54. Thermal analysis of butadiene–styrene rubbers under structurization with latent solidifier.

/M.Shalamberidze, Z.Kopadze, N.Lomtadze/. Proceedings of the Georgian National Academy of Sciences, Chemical Series. – 2008. – vol.34. – No.1. – pp. 107–110. – Rus.res.: Geo, Eng.

The physical, phase and thermal transition processes of structurization and destruction of butadiene–styrene rubbers with latent solidifier LO–3 have been studied. It is proved that the structurization of polymer compositions by latent solidifier LO–3 takes place in the temperature range of 150–170⁰ C during 3–3.5 minutes.

UDC 621.763

UDC 678.742.2.038.6

B2.55. Selection of stabilizers for Eklari-filled PVC composites. /N.Kheladze, K.Pataridze, D.Kiria, L.Kheladze, M.Sharabidze, T.Nadiradze/. Novation. – 2008. – No.2. – pp. 33–37. – Rus. res.: Geo, Rus, Eng.

The work discusses the influence of stabilizers on PVC composites obtained from the mineral filler – white and pink Eklari prevalent in western Georgia. As a research object, the following commercial stabilizers are selected: stearates of calcium, cadmium, barium, lead silicate, the epoxy soya oil, and their mixtures. With the introduction of the stabilizer grows the induction period, and the decomposition temperature of the initial PVC decreases by 11–16⁰ C; concurrently, the sample weight loss is reduced. The potency of additives grows upon use of their mixtures, and the decomposition start temperature growth makes 28–40⁰ C. The maximum effect is achieved upon introduction of the stabilizer mixtures in the following proportion: C₁Cd:PbSiO₃=3,0:3,0. In this case, the decomposition start temperature of the filled polymer composite grows by 44⁰ C. In addition to their stabilizing effect, the mixtures increase the ability to process composite materials. Thus, with an increase in the content of these additives in the PVC composite, also grows its dynamic thermal stability and color fastness.

UDC 541-49

B2.56. Methods of studying manganese acetate compounds (II). /I.Bregvadze/. Novation. – 2008. – No. 2. – pp. 38–45. Geo. res.: Geo, Rus, Eng.

The work deals with the individuality of all acetate compounds (II) educed by using the method of IR spectroscopy, x-ray spectral analysis and termography. The carried out conductivity studies of water solutions of acetic manganese compounds (II) show that acetic groups are found in the internal coordination sphere. The water solutions of acetic manganese compounds (II) behave as three-ion electrolytes. The IR absorption spectra were recorded in the 400–4000 cm⁻¹ area of the spectrophotometers UR–10. It is shown that in the studied manganese complexes (II) the condition of acetic groups is close to that of ionic. The stretching vibrations of the acetic groups are predominantly within the field of ~1550–1570 and ~1410–1420 cm⁻¹ respectively. These oscillation values do not significantly differ from the values of similar frequencies in the spectra of acetic alkaline metals that, obviously, is indicative of the predominantly ionic state of the acetic groups in the acetic manganese complexes (II) studied by us. These predominantly ionic bonds of manganese (II) – oxygen atoms of carboxylic groups acetic groups are, however, relatively stable, since the complexes, as already indicated above, do not detach acetic groups when dissolved in water, but behave as acetic electrolytes. The methods of thermography are used to characterize the processes of thermal transformation of acetic manganese compounds (II) upon their continuous heating at ambient air temperature up to 600-1000⁰C. In the beginning they lose water, then the acetic groups, producing as the end product (with admixtures of alkaline metals) mostly oxide Mn₃O₄.

UDC 621.891

B2.57. Friction and wear peculiarities of a nanoporous-based brake block lining. /E.Kutelia, D.Gventsadze, O.Tsurtsunia, R.Datiashvili, L.Gventsadze/. Novation. – 2008. – No.2. – pp. 46–55. – Geo. res.: Geo, Rus, Eng.

The present work deals with the study of the effect of introduction of a nanoporous ingredient into the brake block lining composition on the friction and wear characteristics. Nanopores are formed in the composite by means of diatomite particles. A study of the friction peculiarities and wear mechanisms of the developed porous composites shows that that the particles' microstructure and the heat resistance (up to 900⁰ C) determine high tribological characteristics under conditions of both dry and wet friction. These materials have an aesthetic (not black) colour and its wear products are relatively easy washable. The employment as a binding agent for the new generation composite material of a chemically modified phenol–formaldehyde resin has improved the tribological characteristics of the brake blocks up to 600⁰ C of operational temperature, having increased their efficiency almost twofold. Variation of the content of barium sulfate and diatomite in the composite makes it possible to control the constant of friction within the required range. Values of the constant of friction under conditions of dry friction vary in the range of 0,3–0,45 and remain factually the same under conditions of wet friction. The obtained results allow concluding that the new developed composite is the best material for brake block linings as compared with the conventional asbestos-free materials.

UDC 582.28:54.057:57.05

B2.58. Control of the cellulase and xylanase synthesis of basidium fungi. /M.Bakradze, N.Dzotsenidze/. Novation. – 2008. No.2. – pp. 55–59. – Rus. res.: Geo, Rus, Eng.

An induction mechanism of the cellulase and xylanase synthesis controllable by a single regulatory gene, has been discovered for a line of basidiomycetes. Analyses carried out by involving different basidiomycetes have confirmed that the fungi cellulases and xylanases represent an inducible enzyme. The basidial fungus *Schizophyllum commune* showed the highest activity on the third day of fermentation. The last activity maximum was marked on the 12th day of the cultivation.

UDC 678.063

B2.59. Effect of vulcanization techniques on conductivity of silastic and graphite extenders. /J.Aneli, O.Mukbaniani, T.Kakulia, M.Bolotashvili, L.Shamanauri/. Novation. – 2008. – #1. – pp. 13–21. – Eng. res.: Geo, Eng.

The effects of the receptor factor and vulcanization techniques on the conductivity and mechanical strength of rubbers produced on the basis of silastics and graphite extenders have been investigated. It is shown that the composites containing the thermally expanded graphite and the so-called highly structured technical carbon significantly increase conductivity of the materials produced by using all the vulcanization techniques. In addition, if the vulcanization proceeds by using the polymerization filling method, both the conductivity and mechanical strength increase by several orders. The obtained data are explained by changes in the microstructure of the vulcanized rubbers as a result of a significant difference in the structure of the vulcanized rubbers and the sizes of the surface physico-chemical characteristics of the filler particles. These factors essentially influence the particles distribution character in the polymer matrix and, consequently, the composite material conductivity.

UDC 577.34:502.75

B2.60. Development of plant radiobiology in Georgia. /M. Gogebashvili, N.Ivanishvili/. Radiological and Agroecological Researches. – 2008. – vol.III. – pp. 116–120. – Eng. res.: Geo, Eng.

In this article the basic points concerning with formation and development of plant radiobiology as scientific discipline in Georgia are described. The factual material of formation and organization of the laboratory of plant radiobiology of the institute of agrarian radiology and ecology of Georgia is provided. Some scientific investigations which have found international authority in this scientific branch are numbered.

B3. Geology. Geodesy

UDC 551.311.21

B3.1. The influence of climate on the development of natural exogeological processes and criteria of their assessment. /G.Gobechia, E.Tsereteli/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 33–35. – Rus. res.: Geo, Eng, Rus.

The paper discusses the question of the influence of climate on the development of exogeological processes – intensively developed in mountainous regions of Georgia. An assessment is made of the spatial variability of the regime of development of exogenous geological processes, with account of the climatic factor and the many-sidedness and complexity of the problem of the role of climate and the character of manifestation of exogenous geological and hydrodynamic processes.

B4. Geography. Cartography. Astronomy

UDC 531.582.556.5

B4.1. Investigation of the geological stability of the natural–technogenic complex of the Bzhuzha HPS. /T. Tevzadze, S. Kandelaki, D. Potskhveria, D. Lortkipanidze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 77–90. – Geo. res.: Geo, Rus, Eng.

The paper considers the conditions of equilibrium of the existing geocological situation of the natural–technogenic complex (principal structure – environment) of Bzhuzha HPS. The possible development of negative phenomena has been determined on the basis of determination of physical properties, stress and other stability characteristics, as well as of the angle of internal friction and cohesion at the smooth state of the surface of rocks. Appropriate protective measures have been selected.

UDC 52-77

B4.2. Correlation between the solar radio noise storm and the photosphere optical formations. /Sh. Makandarashvili/. Bulletin of the Georgian National Academy of Sciences. – 2008. – vol.2. – #2. – pp. 45–48. – Geo. res. Eng.

A long-term observation of the solar radio noise storms carried out at E.Kharadze Georgian National Astrophysical Observatory on the solar radio telescope at 210 MHz is presented. It is shown that there is a strong correlation between the amplitude of the noise storm and sunspot number and their access.

C. TECHNICAL AND APPLIED SCIENCES. SECTORS OF ECONOMY

C1. Power Industry

UDC 69.05 (075 m)

C1.1. Use of solar energy to increase the service life of waterworks. /I. Iremashvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 119–126. – Geo. res.: Geo, Rus, Eng.

Questions of using new energy-saving technologies in construction are discussed briefly in the paper. The dynamics of propagation of thermal energy in concrete under one-sided and two-sided heating has been studied. A technology of thermal treatment of concrete with the aid of polyethylene films is proposed. The temperature changes in the upper layers of concrete by the coverage degree and the concrete temperature increase by using solar energy are presented in a tabular form.

UDC 531.582.556.5

C1.2. Forms of water in soils, power of interaction, classification and methods of identification. /L. Itriashvili, Kh. Kiknadze, E. Khosroshvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 127–134. – Geo. res.: Geo, Rus, Eng.

On the basis of an analysis of numerous literary data and findings of personal studies, the paper proposes: a specified power conception of water-soil interaction, a new classification of forms and categories of water, and methods of practical determination of the quantitative indices of the corresponding moisture content.

UDC 621.311.21

C1.3. Variable-head hydroelectric power plant. /V.Jamarjashvili, G.Gigiberia/. Energy. – 2008. – #3(47). – pp. 9–17. – Geo. res.: Geo, Rus, Eng.

In accordance with the proposed technology, the river-supplied hydroenergy will be used on a HPP water reservoir, which is lost on existing HPPs when the water level in the reservoir varies from the maximum to the minimum value, and vice versa, i.e. in the months of the drawdown (autumn–winter) and impoundment (spring) of the reservoir. The innovative variable-head HPP withdraws water from a diversion facility located near the river inflow to the reservoir. Thereafter, by a diversion conduit the water is supplied to the elevated reservoir located in the lowest water level mark. From the reservoir, a turbine pipeline is directly connected to the hydraulic unit that can be mounted on a platform floating in the water reservoir. The variable-head HPP will operate on variable pressure. In the case of a pressurized diversion, the arrangement of the elevated reservoir may no longer be needed. The innovative technology has been patented. The proposed technology is cost-effective and can be introduced on the following water-reservoir Georgian HPPs: Zhinvali, Inguri, Sioni, also Khudoni, Namakhvani, etc. in the future.

UDC 621.316.925

C1.4. Calculation of leakage inductance in double steel-core reactor. /R.Arveladze, K.Tsereteli, Z.Kakhniashvili/. Energy. – 2008. – #3(47). – pp. 51–55. – Geo. res.: Geo, Rus, Eng.

One of the effective methods of elimination of an impact load on other customers is to use the principle of an adjusted double reactor. The steelcore reactor capacity greatly depends on the coupling coefficient determinable by the leakage inductance. In order to determine the leakage inductance, a method of average geometric distance is used. The influence of ferromagnetic surfaces on the volume of leakage inductance is determined by means of multiple mirror imaging. An expression for determination of this impact is obtained. It is shown that during the determination of leakage inductance consideration of only the double imaging will suffice, as the impact of other imaging on the volume of leakage inductance is less than 1%.

UDC 621.3.054

C1.5. On the determination of power characteristics of Georgian hydroelectric power plants.

/G.Makharadze, T.Jikia/. Energy. – 2008. – #3(47). – pp. 66–69. – Geo. res.: Geo, Rus, Eng.

In the system of equations of tasks of the optimization of power system regimes, a numerical expression of the consumption rate is one of the most important characteristics of a HPP. The calculated expression of the consumption rate can be obtained both on the basis of the plant data, as well as in-situ measurements. The least-squares method is used to obtain the consumption rate. The calculated value is deduced specifically for Inguri, Vartsikhe and Khrami–1 HPPs. The calculation results given in a tabular form agree well with the experimental data: difference is not more than 2%. It points out that the calculated expression developed for determining the consumption rate of a HPP can be used for solving the problems concerning optimization of the power entities of the country.

UDC 621.311.21

C1.6. Determining economic efficiency of promising waterpower objects in the river-management plan. */A.Gioshvili, R.Pataraiia, G.Khelidze/. Energy. – 2008. – №3(47). – pp. 70–73. – Geo. res.: Geo, Eng, Rus.*

A method of determining the economic efficiency of promising waterpower objects introduced in the river-management plan is proposed. The method is based on the statistics of currently run HPPs and foresees the following: investment in the construction of HPPs, their service length, the expected average annual output of the entity; tariffs determined by the National Regulatory Authority, as well as total costs of during operation.

UDC 621.311.1

C1.7. Back-to-back direct current converter station and control of overflows. */G.Arziani/. Energy. – 2008. – #3(47). – pp. 74–77. – Geo. res.: Geo, Rus, Eng.*

In the near future, exports of electricity to Turkey from the power system of Georgia and Azerbaijan are planned. The construction of several 500 kV lines and a 500/400kV converter substation in Akhaltsikhe. is intended. The latter is back-to-back direct current converter station. It will enable to implement an asynchronous operation of energy systems of Georgia, Azerbaijan and Turkey. A short analysis of this kind of operation in the case of disturbances of different kind in the power systems is presented.

C2. Electrical Engineering. Electronics. Radio Engineering. Communications

UDC 621.3.016.313

C2.1. Assymetric equations describing short circuits. */N.Turkia, V.Bantsadze/. Energy. – 2008. – #3(47). – pp. 33–38. – Geo. res.: Geo, Rus, Eng.*

A method of deriving uniform equations describing the state of a power system under different series faults is considered. According to the method of symmetrical components, the unbalanced condition is disintegrated into several balanced conditions. In each of them, the short circuit is simulated by the perfect current source. The corresponding mathematical model consists of linear equations connecting the direct, reverse and neutral sequences. The modeling of different-sequence currents by means of current sources makes it possible to describe equations for each of the sequences using a matrix of nodal resistances, whose elements do not change depending on the number and place of faults. The proposed method may also be used under conditions of phase-to-phase short circuits and series unbalanced loads.

C3. Automation & Telemetry. Computer Engineering

UDC 669.15–198:681.2–5

C3.1. Automation of melting of refined ferroalloys and low-phosphorous slag from disperse waste. */G.Jandieri, D.Robakidze/. Novation. – 2008. – #2. – pp. 127–131. – Rus. res.: Geo, Rus, Eng.*

A structure of a complex automated system to control the technological melting process of valuable low-carbon and low-phosphorous ferroalloys and slag from own disperse metal and nonmetallic waste has been developed. The system consists of two levels. The upper level is presented by instrumentation modules in contact with the furnace carrying out the receipt and injection of analog and discrete signals; the lower level is represented by a complex of local systems of automatic development and realization of control actions.

UDC 57:519.767.4

C3.2. Development of artificial intelligence systems for purposes of vibroacoustic diagnostics.

/N.Kopaliani, D.Kopaliani/. Novation. – 2008. – #1. – pp. 22–31. – Eng. res.: Geo, Rus, Eng.

The article briefly describes the elementary and basic ideas and concepts of artificial intelligence systems. The machine thinking means (objectives, facts, rules, the mechanism of simplification, the mechanism of conclusion) are given and analyzed. The problems of working out of the main components of the system of artificial intelligence are dealt with. The notion of algorithm – a detailed list of all logical steps of decision-making – is defined.

UDC 629.14: 658.5

C3.3. Optimization of technical-and-economic indices in the automated equipment design stage.

/G.Mchedlishvili, G.Tkeshelashvili, T.Mchedlishvili, B.Navrozashvili/. Transport and Machine Building. – 2008. – #2(10). – pp. 89–97. – Rus. res.: Geo, Eng.

The structural scheme of a combination of composite methods of realization of individual calculation–analytical procedures is considered given the economic efficiency indices against the technical indices elaborated in the method of synthesis by given transient processes. Considered are the issues associated with the choice of processes desirable for realization of a multi-criteria parametrical and structural synthesis given the impact of a series of regular and accidental external processes upon the system; the calculation of the system's comparative economic efficiency indices based on the condition of a complex matching with technical and economic indexes, which makes it possible to realize the structural variation of a system to be developed.

UDC 621.31

C3.4. Automated commercial electricity recording/billing system introduced in JSC Telasi.

/M. Kobalia, T. Kandelaki, B. Tsopurashvili/. Energy. – 2008. – #3(47). – pp. 6–8. – Geo. res.: Geo, Rus, Eng.

The automated commercial electricity billing system introduced in JSC Telasi is described. The long-service multifunctional and multicomponent system is shown to consist of a software, information and organizational technical facilities, a data collection center, the euro–alpha type electricity counters, etc. The introduced system, on the basis of reliable data, makes it possible to carry out financial accounting with both the wholesale energy market, as well as other electricity providers. The article also deals with the advantages and gains of introduction of the system at the company.

C4. Mining. Metallurgy. Chemical Industry

UDC 669.712

C4.1. Autoclave battery discharge in the continuous-flow production of aluminum.

/M.Sharifova, I.Abbasov, G.Isamailov, G.Akhundov, S.Aliev, N.Japarov/. Novation. – 2008. – #2. – pp. 71–75. – Rus. res.: Geo, Rus, Eng.

The urgency of automated control in the production of aluminum and in the development of respective instrumentation has been shown. The technological process efficiency is greatly dependent on the raw material quality and the stability of the system parameters. Induction flowmeters being currently used in the automation of aluminous production are not effective, are prone to frequent failures and are frequently substituted with mechanical tools. The optimum parameters of the mixer sizes are determined and an example of practical application thereof is given, taking into account the corresponding adjustments in relation to instrumentation indications. A process flowsheet of pressure leaching of the pulp gas been developed. Advantages of the proposed method consist in the continuous-flow production and minimum labor inputs.

UDC 622.276

C4.2. Recommendations on carrying out oil and gas prospecting work within the the eastern part of the Ajara–Trialeti Folded Zone and Artvin–Bolnisi Lump.

/N.Chakhnashvili/. Energy. – 2008. – #3(47). – pp. 60–65. – Geo. res.: Geo, Rus, Eng.

The work considers the prospects of the eastern part of the Adjara–Trialeti Folded Zone and the Artvin–Bolnisi weakly–folded zone (lump) in terms of their reserves of oil and gas that need further prospecting. The above prospects are based on numerous occurrences of natural oil and gas found in the region in the course of drilling operations. The geology of the region and its prospecting details have been given.

UDC 621.791.755

C4.3. Study of powder utilization factor against main parameters of high enthalpy laminar streams of plasma. /M.Khutsishvili, L.Kikvadze, A.Sulamanidze, Ts.Darchiashvili, G.Prangishvili, G.Khutsishvili/. Energy. – 2008. – #3(47). – pp. 82–86. – Geo. res.: Geo, Rus, Eng.

The effectiveness of deposition by the powder utilization factor β has been studied. The dependence of the β factor upon the arc power is shown. An optimal power of the arc is determined. Under low-power, the powder practically does not melt and the factor β is minimal. With the rising of the arc current and correspondingly the power of plasma, the factor β increases to a definite size. The factor β decreases as a result of an increase in the evaporation of the sprayed powder. Other details of the process are discussed.

C5. Mechanical Engineering. Instrument-making

UDC 681.62

C5.1. On some problems of dynamics of the hydro-servo system of tea-picking machine. /R.Kiria, Z.Uplisashvili/. Transport and Machine Building. – 2008. – #2(10) – pp. 137–141. – Rus. res.: Geo, Eng.

The design of a tea-picking machine's hydro-servo system is considered. The proposed model makes it possible to control the movement of the machine on the controlled system according to the tea bush profile in both the horizontal and vertical directions. To solve the problem, a dynamic investigation of the mechanisms for automated control of the tea-picking machine have been carried out, enabling determination of the kinematic parameters of their individual links and conditioning a sharp increase in the qualitative and quantitative characteristics of the machine performance. For this purpose, the article examines the following parameters of the controller: the number of gears, the spring strength factor, etc.

UDC 577.4

C5.2. A new water-level measuring device. /I.Gabrighidze, Z. Gedenidze, V.Gabrighidze, L.Mosavidze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 20–21. – Geo. res.: Geo, Rus, Eng.

A device for measuring the level of water in a storage reservoir is considered. In comparison with the existing devices, it stands out for simplicity of the design, regulation of the precision of measurements and reliability in service.

UDC 631:367.3

C5.3. Mobile water sprinkler. /O.Nanitashvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 175–178. – Geo. res.: Geo, Rus, Eng.

Three versions of a mobile water-sprinkler have been developed for irrigating agricultural crops under three different types of mobile pumping stations; their specifications have been given.

UDC 631.3: 631.86

C5.4. Rolling furrow. /V.Samkharadze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 183–187. – Geo. res.: Geo, Rus, Eng.

A rolling furrower cutting irrigation furrows by ramming rather than digging has been proposed. The new technology and design enable to reduce water-erosion, to increase the length and the service life of the furrows.

C6. Light Industry

UDC 685.314.13

C6.1. Problems of construction of the spatial form of shoe blocks and a dummy. /M.Grdzelidze, I.Charkviani/. Novation. – 2008. – #2. – pp. 76–79. – Geo. res.: Geo, Rus, Eng.

Problems of shoe block' design is directly connected with footwear comfortableness depending on the extent to which its shape and sizes determine the inside form of footwear. A dummy is a good means to replace a person during individual tailoring and to simplify quality control of the finished good, as well as to compile a matrix after coordinates in a three-dimensional system of the basic anthropometrical data have been specified. The construction of a plane on the basis of the anthropometrical data enables to produce shoe blocks and a dummy on an individual basis, taking into account the peculiar features of the shape and the sizes of the foot and body.

UDC 685. 31/32

C6.2. Problems of automated design of footwear. /M.Grdzelidze/. Novation. – 2008. – #1. – pp. 22–31. – Geo. res.: Geo, Rus, Eng.

The problem of geometrical modeling is associated with the complexity of a shoe block surface. For this purpose, after specification of the coordinates of the basic anatomical points of a shoe block, it is necessary that a matrix be constructed by the coordinates of specific points and be used for correcting the prototype.

C7. Food Industry

UDC 678.746.47

C7.1. Research of the polyphenolic compounds' change during quince processing. /N.Gumbaridze, A.Porchkhidze, L.Gobejshvili/. Novation. – 2008. – #2. – pp. 60–64. – Geo. res.: Geo, Rus, Eng.

The research of polyphenolic compounds in the composition of quince and of their modification in the course of processing is important for raising the finished product's quality. Quince is used in food industry, in medicine and as a technical raw material. Therefore, the issue of its study is topical. At the first stage of processing, the object of research were identified and studied for the content of chlorogenic acids, catechins, leucoanthocyanidins and flavanol by chromatographical separation on paper. The data on the content of these substances in fresh fruit, during processing and in the finished product have been obtained. According to the obtained data, in the course of peeling and cutting of the fruit, the content of chlorogenic acid reduces by 120 microgram/g, leucoanhtocyanidins – by 320 microgram/, catechins – by 120 microgram/g and flavonols – by 40 microgram/g. Experiments were carried out to study the transformation of phenolic compounds during processing of the unpeeled fruit. These compounds have been found to be preserved in great amounts in the content of processed unpeeled fruit. The study results has made it possible to establish that the product produced from the unpeeled fruit possess the highest food value and is characterized of better gustatory qualities and aroma.

UDC 613.26/.29:539.164

C7.2 Staple food products and radionuclides. /M.Mikeladze, M.Dvali, D.Lolishvili, M.Liparteliani, N.Imnadze/. Radiological and Agroecological Researches. – 2008. – v.III. – pp. 17–20. – Geo. res. Eng.

The contamination of staple food products by radionuclides has been studied. It has been found that both the t imported and the locally produced food products, such as salt, eggs, wheat, etc., contain radioactive isotopes, because of which a strict radiation control needs to be introduced.

C8. Construction. Architecture

UDC 693.98.001.24

C8.1. Combined constructions report in consideration of the probability nature of the concrete creep strain characteristic. /M.Chanturia, M.Berishvili/. Building. – 2008. – #2(9). – pp. 55–59. – Geo. res.: Geo, Rus, Eng.

The concrete creep strain values represent variates, the probable deviations of which are distributed by a normal deviation law (Gauss Law). The creepot boundary value figures in a differential equation of the force change developed as a result of the creep strain in the combined constructions; i.e. the force change represents a function derived from a random variable and is, therefore, a random variable itself with its random deviations being distributed by the logistic distribution law.

UDC 624.14:692.412

C8.2. Construction and nondestructive check methods for ensuring the security of buildings. /G.Lagundaridze, R.Zhgenti, I.Garibashvili/. Building. – 2008. – #2(9). – pp. 142–148. – Geo. res.: Geo, Rus, Eng.

Construction and nondestructive check methods for ensuring the security of buildings have been worked out. The methods of risk analysis application for evaluating the state of buildings have been provided. The evaluation of the seismic stability of buildings is reviewed according to the residual life.

UDC 691.32

C8.3. Concrete hardening effect on its deformation and cracking. /M.Turzeladze, L.Zukatishvili/. Building. – 2008. – #2(9). – pp. 134–138. – Geo. res.: Geo, Rus, Eng.

The deformation and cracking processes of the concrete hardened under different conditions have been studied. During the experiments carried out for the purpose, one of the best acoustic emission (AE) methods of the analysis of the tensometric as well as crack formation processes has been applied. Experiments are carried out on the samples hardened under the evaporated and natural conditions. Joint application of (AE) acoustic emission and tensoresistive measurement methods made it possible to determine the volume of acoustic emission in the concrete during loading and the upper and lower limits of crack formation on the volume deformation diagrams of the concrete compression. An analysis of the results has showed a significant difference in the deformation and crack formation processes of the samples hardened under various conditions of humidity, which will enable to plan the best concrete hardening environment in advance.

UDC 691.32

C8.4. Determining moisture resistance of a different-age fine concrete. /A.Sakvarelidze/. Building. – 2008. – #2(9). – pp. 114–117. – Geo. res.: Geo, Rus, Eng.

An experimental and theoretical investigation to determine the moisture resistance characteristics of fine concrete has been carried out. The methods of the study conduct are given. Specimens of fine concrete cylinders ($d=70$ mm and $l=70$ mm) of age 28 and 90 days, with water content of 4.7% (on weight) have been tested for the purpose. An experimental curve of the moisture content change of the material has been constructed. By comparing and analyzing the experimental and theoretical data, the fine concrete moisture resistance characteristics: the moisture diffusion ratio, the moisture ratio and the relative moisture loss ratio have been calculated.

UDC 691.32:69.058.2

C8.5. The effect of deformation velocity on the stress-strain properties of fine concrete with different moisture content at compression. /A.Sakvarelidze, N.Gudushauri/. Building. – 2008. – #2(9). – pp. 111–113. – Geo. res.: Geo, Rus, Eng.

The effect of deformation velocity on the stress-strain properties (strength, ultimate deformation, module of elasticity) of fine concrete at compression is investigated. The test was conducted on the universal testing machine "Instron-1115", at five levels of the deformation velocity: $4.3 \cdot 10^{-7}$ 1/ sec; $4.3 \cdot 10^{-6}$ 1/ sec; $4.3 \cdot 10^{-5}$ 1/ sec; $4.3 \cdot 10^{-4}$ 1/ sec; $4.3 \cdot 10^{-3}$ 1/ sec. The specimens of prisms (40x40x160) with different moisture content were tested: "wet" specimens with moisture content $W=4, 7\%$ (by mass) and "dry" (dried up to the permanent weight) specimens - $W=0$. 36 "wet" and 36 "dry" specimens were tested in total. The carried out tests have shown that the effect of the deformation velocity on the stress-strain properties of fine concrete upon compression is rather insignificant.

UDC 691.328

C8.6. Cement saving in concrete and reinforced concrete technology. /A.Chikovani, D.Tevzadze/. Building. – 2008. – #2(9). – pp. 60–65. – Geo. res.: Geo, Rus, Eng.

The article deals with the methods of saving the most expensive material - cement in the modern concrete and reinforced concrete technology.

UDC 666.982.24:620.193./199

C8.7. Corrosion of steel reinforcement in concrete. /A.Chikovani, D.Tevzadze/. Building. – 2008. – #2(9). – pp. 66–69. – Geo. res.: Geo, Rus, Eng.

The article deals with the corrosion of steel reinforcement in the reinforced concrete as well as with the aggressive environmental conditions leading thereto. The means of protecting the steel reinforcement from corrosion are given.

UDC 624.14:692.412

C8.8. Energy-efficient potential of dwelling house in Georgia. /M.Sadaghashvili/. Building. – 2008. – #2(9). – pp. 105–110. – Geo. res.: Geo, Rus, Eng.

The article deals with the the energy-efficient potential of dwelling houses given the climatic peculiarities of Tbilisi and Georgia, as well as with the probable economic effect of energy saving. The development of a relevant legislative and normative base is recommended.

UDC 691.213.5

C8.9. The use of perlite in industrial and civil constructions. /Z.Karumidze, V.Bekaia/. Energy. – 2008. – #3(47). – pp. 47–50. – Geo. res.: Geo, Rus, Eng.

The possibilities of using the Paravani deposit perlite in modern industrial and civil constructions are considered with due regard for high heat-insulating properties of the material. The possibility and the expected benefits of using local raw material in the production of light and superlight perlite concrete are discussed.

UDC 691.328

C8.10. Saving of cement in the production of concrete and reinforced concrete. /A.Nadiradze, L.Chaladze/. Energy. – 2008. – #3(47). – pp. 56–59. – Geo. res.: Geo, Rus, Eng.

The article deals with several reasons that condition the growth of cement consumption in concrete are considered and the ways of its saving and making the product cost-effective are discussed.

C9. Agriculture and Forestry. Fishery

UDC 577.15:577.352.334

C9.1. Effect of light on the o-diphenol oxidase activity. /N.Margevelashvili, Sh.Kvitsaridze, N.Ghvinia-nidze/. Novation. – 2008. – #2. – pp. 65–70. – Geo. res.: Geo, Rus, Eng.

Activity of the o-diphenol oxidase enzyme is determined by the Boyarkin method at the early phase of ontogeny in maize and corn. In particular, dry seeds, germinated seeds, coleoptiles, roots in the coleoptiles phase, the first real leaves, roots at the stage of the first real leaves; etiolated acrospires were used in the study. The enzyme activity in the study objects varies according to the phase of ontogeny. In dry seeds, the enzyme activity has not been observed. The maximum enzyme activity occurs in the roots in the coleoptiles phase, and minimum in the first real leaves. In both object the enzyme activity in the roots in the coleoptiles stage and the first real leaf is greater than in the corresponding above-ground parts. The light effect on the o-diphenol oxidase activity has been investigated in the roots at the stage of the first real leaf, in the roots of the etiolated acrospires of corn and maize. In both cases, the enzyme activity in the roots of the etiolated plants is higher than in the corresponding leaves. Generally, the o-diphenol oxidase activity in the etiolated acrospires is higher than in the plants grown in the light.

UDC 582.883.4

C9.2. Results of study of the main points of agronomical practices of the eucalyptus plant under conditions of Imereti. /A.Mikeladze, M.Kheladze/. Novation. – 2008. – #2. – pp. 80–83. – Geo. res.: Geo, Rus, Eng.

The article deals with the national economic importance of aromatic eucalyptus plant and the wide application of its valuable volatile oil in medicine, perfumery and cosmetics. According to the data given in the article, the eucalyptus plant is cultivated in the subtropical zone of Western Georgia, on the coastal area of the Black Sea, in Ajara, Abkhazia, Guria and Samegrelo. The results of study of some main points of agronomical practices of the eucalyptus plant: the species *Eucalyptus viminalis* and *Eucalyptus cinerea* in the three co-ordinates of Imereti: Kutaisi, Tskaltubo and Vani are presented. The dynamic of growing plants was more intensive in Tskaltubo than Kutaisi and Vani by studding facts. According to the study data, the plant reveals the maximum growth dynamics in Tskaltubo region. The *cinerea* species outcrops *viminalis* and has the better oil yield. According to the physico-chemical indicators of volatile oil, the oil content of *cinerea* is 1.2%, that of *viminalis* – 0.6%. The average content of cineol in the oil of *cinerea* is 61%, of *viminalis* – 46%. By the economic efficiency measure, the level of profitability has made 78 to 137%.

UDC 582.475.4

C9.3. Peculiarities of Caucasian pine (Pinus Sosnowskyi Nakai) stem wood biomass gain and economic activities targeted at its increase. /E.Lobzhanidze, M.Gabunia, D.Tsertsvadze, B.Lobzhanidze/. Novation. – 2008. – #1. – pp. 89–96. – Geo. res.: Geo, Rus, Eng.

The conduct of sanitary felling in pine woods up to the 0.6 density improves the light regime of the woods and the cambium activity increase in the cut area against the control one by 5 to 30 days, also the radial increment of wood annual rings by 50–70%, an increase in the latewood content in annual rings by 25–70%, in the length of tracheides by 4–32%. Thus, the sanitary feeling, as a significant forestry measure, increases the wood biomass of pine forest and improves the anatomic structure and technical properties of the wood, depending on the forest exposition and the wood growth class.

UDC 638.132

C9.4. Melliferous resources of Meskheti and ways of their conservation. /L.Baliashvili/. Agrarian-Economic Science and Technologies.– 2008. – #1. – pp.128–135. – Geo. res. Eng.

The article deals with the problems of conservation of melliferous plants in Meskheti that present a valuable resource base for apiculture development and honey production in the region. The areas under melliferous plants, their names, as well as the ways of honey productivity increase are discussed.

UDC 635.07

C9.5. On the assessment and effective use of the agricultural natural resource potential. /N. Chincharauli/. Economics and Business. – 2008. – #1 – pp. 132–143. – Geo. res.: Geo, Rus, Eng.

The article deals with the issues of proper assessment and effective use of the available agricultural natural resource potential that are rather urgent for coping with the problems of food supply to the Georgian population under the current economic crisis. The available shortcomings and the ways of their overcoming are discussed.

C10. Water Industry. Melioration

UDC 627.8

C10.1. The total waterpower potential of the South Caucasus and its prospects. /N.Kodua, T.Mikiashvili, K.Magradze/. Hydroengineering. – 2007. – #3(3). – pp. 26–29. – Eng. res.: Geo, Rus, Eng.

The technical and economic assessment of the waterpower potential of the South Caucasus republics (Armenia, Azerbaijan, Georgia,) carried out by using the recommended under the planned economy conditions minimum-cost criterion is given. It is shown that in the market economy environment resources may be used on the basis of developing investment projects where the economic efficiency of an investment will be determined by the NVP criterion. The use of this criterion at a feasibility study will allow conducting calculations and identifying a HPP to be built in the first turn. The NVP calculation formula for determining economic efficiency of investments in power objects is given.

UDC 627.233.6

C10.2. Calculation of water storm surges on seashore slopes. /Sh.Gagoshidze, I.Kadaria/. Hydroengineering. – 2007. – #3(3). – pp. 30–36. – Geo. res.: Geo, Rus, Eng.

The article provides a calculation method of littoral area inundation marks for the case when the storm is directed from the sea to the shore. The method is based on an exact analytical solution of the Helestorm–Langhard–Kalegan formula, with the involvement of new, physically justified boundary condition on the shore line.

UDC 678.058.6

C10.3. Investigation of the regeneration process of Na-cation exchanger by sodium sulphate solution. /Z.Megrelishvili, L.Klimiashvili /. Hydroengineering. – 2007. – #3(3). – pp. 37–46. – Eng. res.: Geo, Rus, Eng.

Laboratory investigations by means of sodium sulphate solution have made it possible to outline the main regularities and peculiarities in a sodium cation-exchange unit regeneration process. The methods of calculation of the working exchange capacity of cationite of the existing and newly designed ion exchangers have been worked out. The value of found coefficients can be used to solve the practical task of optimization of the regime of the existing installations by finding the specific discharge of the reagent corresponding to the minimum given discharge. A mathematical–statistical processing of the test data has also been carried out.

UDC 678.058.6

C10.4. Substantiation and analysis of ion exchange process in “humus–acid–ion–steel” system and formation of colloidal structure of humates. /N.Geladze, N.Balakhadze, N.Chapodze/. Hydroengineering. – 2007. – #3(3). – pp. 54–59. – Geo. res.: Geo, Rus, Eng.

Scientific researches have brought us to the conclusion that the colour of natural waters depends upon high molecular humic substances produced by transformation of organic wastes as a result of physico–chemical and biological processes under the action of microorganisms. Humic substances of natural waters can be attributed to polyelectrolytes with weakly expressed acid properties which are conditioned by the presence of carboxylic (COOH) and phenol hydroxyl (OH) groups in the structure of humic substances.

UDC 628.1

C10.5. On determination of exploitation expenses of pipelines and reinforcement in water supply systems. /M.Natsvlishvili, E.Siradze/. Hydroengineering. – 2007. – #3(3). – pp. 88–93. – Geo. res.: Geo, Rus, Eng.

The approach to the determination of exploitation expenses for water supply pipes and reinforcement operation with consideration of the measures of their ecological safety and dependability is presented. Upon operation of different district water supply systems this approach enables to determine the sequence of measures and respectively to provide exploitation services with material and economic resources needed for making correct and operative solutions.

UDC 626/627

C10.6. Problems of hydroecology of river estuaries of tideless seas. /A.Gemazashvili, A.Chochishvili/. Hydroengineering. – 2007. – #3(3). – pp. 94–96. – Geo. res.: Geo, Rus, Eng.

General hydroecological problems of river estuaries of tideless seas are considered. The peculiarities of interaction of fresh river and saline sea waters in the area of sea shore are highlighted. The information given in special scientific literature about hydroecological engineering problems created with saline water is given.

UDC 577.4

C10.7. Protection of the quality of water resources in mudflow regions. /R.Diakonidze, N.Labartkava, I.Pirtskhalaishvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 40–45. – Geo. res.: Geo, Rus, Eng.

The paper is devoted to an important problem of today: rational and planned use of freshwater discharges, as well as protection of its quality. A calculation is presented of the volume of freshwater resources per unit of the earth's surface and a corresponding analysis is made for the entire territory of Georgia. Special attention is given to the protection of the quality of freshwater resources in mudflow catchment basins. Dependences are proposed for calculating some prognostic hydrological characteristics, with appropriate recommendations on the protection of the ecological safety of mudflow water catchment basins.

UDC 551.311.21;613.4

C10.8. High–water phenomena on the Rioni and prediction of maximum discharges. /G.Dokhnadze, Z.Charbadze, D.Lortkipanidze, L.Tsanava/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 54–61. – Geo. res.: Geo, Rus, Eng.

The paper is devoted to floods and high–water phenomena. General approaches to the problem and ways of predicting maximum discharges are discussed on the basis of available observations. An analysis of the 1987 high–water and its consequences is carried out. The expected maximum discharges are calculated for various sites of the river according to the methodology of Acad. Ts. Mirtskhoulava. The derived values of discharges and their observed annual maxima are related to some characteristics of corresponding catchments basins. This link is presented in the shape of graphs and empirical dependences.

UDC 631.674

C10.9. Determination of infiltration parameters in the process of watering with a view to its optimal management. /R.Kiladze, D.Lortkipanidze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 145–149. – Geo. res.: Geo, Rus, Eng.

A method of immediate determination of the infiltration characteristics of the soil in the process of watering, enabling to raise the quality of watering through correction of corresponding parameters (watering discharge, time of its supply, etc) is proposed.

UDC 627.833

C10.10. Hydraulic calculation of water conduits of subsurface–dribbling irrigation. /E.Kukhalashvili, G.Omsarashvili, A.Sakhvadze, M.Kikabidze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 154–157. – Geo. res.: Geo, Rus, Eng.

Theoretical principles of hydraulic calculation of conduits of a subsurface irrigation system are presented. The dependences derived enable to establish the law of the change of perforation density along the distributors, allowing uniform supply of water over the area under irrigation.

UDC 532.591

C10.11. Influence of condensation of the air on the volume of coefficient of elasticity of stream in water conduits of forcing hydro–transporting facilities. /G.Kirmelashvili, G.Khelidze/. Energy. – 2008. – #3(47). – pp. 78–81. – Geo. res.: Geo, Rus, Eng.

A volume of maximum water pressure in forcing pipelines of hydro–transporting facilities depends on the speed of spread of wave blow. The speed is, in its turn, a function of module of stream elasticity. The rated dependences for determination of speed of spreading wave of hydraulic blow originated in forcing hydro–transporting system for adiabatic as well as for isothermal process developed by the authors are presented. The corresponding diagrams are drawn up. Their analysis shows that with enough accuracy for the practice it is possible to determine the speed of spreading the wave by means of simplified expression developed by the authors that corresponds to the measuring process. From the diagrams, we can also point out that the speed of spreading the wave and correspondingly the extremely possible pressure of hydraulic blow under adiabatic process is higher than under isothermal process. The curves, representing adiabatic and isothermal processes, under growth of ratio of diameter of pipeline towards the thickness of its wall are drawn closer. In other words, the difference between the speeds of spreading the waves is reduced.

C11. Foreign and Domestic Trade. Tourism

UDC 379.85

C11.1. Development of agrotourism in Georgia. /O.Keshelashvili/. Economics and Business. – 2008. – #1 – pp. 89–94. – Geo. res.: Geo, Eng.

The diverse natural and economic environment increases the role and possibilities of agrotourism in Georgia. In terms of agricultural particularity, Georgia is a region of world significance. By means of selection species of Georgian vine and wheat, Khevsurian and Megrelian cow, Tushetian sheep, Georgian bee, etc., have been developed. The contrast nature of Georgia, crafts, mastership is unvalued. Agrotourism needs the development of relevant economic mechanisms, the provision of better management and control, the creation of a relevant legal basis. The article deals with the specific tasks to allow achieving of the above objectives as well as with the responsibility of Georgian agrarians and economists therefor.

UDC 379.85

C11.2. Tourism development tendencies in Georgia. /L.Kochlamazishvili, S.Tevdoradze/. Kommersanti. – 2008. – #1(5). – pp. 41–48. – Geo. res.: Rus, Eng.

The article analyzes the geography and dynamics of tourist flows coming to Georgia from different regions on the basis of the 1995– 2006 statistics as well as the problems interfering with tourism development in Georgia.

C12. Transport and Machine-building

UDC 629.463.62

C12.1. Problems of prediction of railway track condition and optimization of railway track operations. /M.Moistsrapishvili, E.Moistsrapishvili, L.Kaladze/. Transport and Machinebuilding. – 2008. – #2(10). – pp. 12–17. – Geo. res.: Rus, Eng.

The article deals with the problems of optimization of current maintenance and repair operations of the railway track, the prerequisite of which is the exact prediction of its condition. An automated method for describing the present condition of the structure is proposed. A concept of synthetic characteristics (qualitative–assessment indices) reflecting the general geometry of the track and constructive parameters has been introduced. A mathematical model-based principle of expert system operation is described.

UDC 621.43.044.6

C12.2. On self–oscillations in motor-generator sets with generators of series and compound excitation. /S.Karipidisi, T.Maglakelidze, P.Barbakadze, A.Maglakelidze/. Transport and Machinebuilding. – 2008. – #2(10) – pp. 18–30. – Rus. res.: Geo, Eng.

For the approximation of essential non–linearity an analytic expression allowing investigation of the behaviour of the system in wide range of load variations derivation of the basic formulas showing the dependence of the self–oscillation frequency on the amplitude and parameters characterizing essentially self–oscillatory processes is proposed.

UDC 656:621.798.13

C12.3. Dynamics of pneumatic vibration transportation of loose materials. /G.Goletiani/. Transport and Machine-building. – 2008. – #2(10). – pp. 31–38. – Geo. res.: Geo, Rus, Eng.

A model of joint action of vibration loose material carrier airflow is proposed A set of equations is derived which solution will allow establishment of the material transportation regularities.

UDC 621.923:658.5

C12.4. On the problem of nonlinear drive systems synthesis given the technical and economic indicators. /Mchedlishvili G.T., Tkeshelashvili G.V., Mchedlishvili T.P., Navrozashvili B.G/. Transport and Machine-building. – 2008. – #2(10). – pp. 39–47. – Rus. res.: Geo, Eng.

The problems of the theory of multi-parameter and multi-criteria synthesis of modern drive systems are considered on the basis of using their linearized models. Both technical and economic indicators of systems have been used as criteria in the multi-criteria synthesis procedures. The article deals with application of the theory of synthesis to the nonlinear systems. A general structural scheme of the consecutive realization of calculated–analytical procedures based on integral approach of processes to the desirable ones is formulated. At the same time, the methods of setting the processes desirable for realization is formulated in the form of linear system solutions that are brought into line with the synthesized nonlinear one.

UDC 621.914.7

C12.5. Definition of a direction of using small–size low–grade wood raw material and the theoretical analysis for its processing on a chipper edger. /Dundua Z., Balamsarashvili Z. Chitidze Z., Gelashvili I., Nachkebia D/. Transport and Machine-building. – 2008. – # 2(10). – pp. 48–55. – Rus. res.: Geo, Eng.

The articles deals with a chipper edger developed at the Research Institute of Forest Industry for processing low–grade small–size logs and producing wood chipboards.

UDC 338.47

C12.6. The state of transport in Georgia and economic problems of its development. /G.Tkeshelashvili, I.Iosebidge/. Transport and Machinebuilding. – 2008. – #2(10). – pp. 56–61. – Geo. res.: Rus, Eng.

The article analyzes the present state of transport in Georgia according to its separate branches, outlines the macro– and microeconomic problems, the solution of which solution will promote the development of transport in Georgia and increase its role in transit transportation.

UDC 681.5.015.22

C12.7. Dynamics of a profile grinding mechanism for constructing an approximated model. /Amkoladze Kh., Asatiani A., Nachkebia B., Edisherashvili P/. Transport and Machinebuilding. – 2008. – #2(10). – pp. 62–67. – Rus. res.: Geo, Eng.

Based on an analysis of the reproduction process realizable on the basis of relative motions of line and circular feeds, the circular feed motion has been noted to be the determinant in terms of dynamics. Thereupon, proposed are approximated mathematical dependences of increments of coordinates of the a–point of the abrasive disk with the working surface, interconnected to the determining degree with the circular motion. A scheme of trajectories of the relative motions of the a–point in considering the running motions in specific secant planes has been investigated to identify parameters of the proposed mathematical dependences. By using the obtained dependences in the procedures for construction of a mathematical model of dynamics of the studied running motions, a set of differential equations necessary for further dynamic researches of the studied process of profiling has been derived.

UDC 66.076.5:678.029.46

C12.8. Device for reinforcing gas cylinders. /M.Shvangiradze, T.Gerkeuli/. Transport and Machinebuilding. – 2008. – #2(10). – pp. 77–82. – Rus. res.: Geo, Eng.

The article deals with the manufacture of experimental, polymer gas–cylinders, wherein for the first time basalt fiber has been used for reinforcement purposes.

UDC 625.162

C12.9. Transfer points' location peculiarities under complicated mountainous conditions. /G.Kvantaliani, H.Kupatadze, L.Razmadze, I.Ghongadze/. Transport and Machinebuilding. – 2008. – #2(10). – pp. 103–108. – Geo. res.: Rus, Eng.

The article deals with problems of train movement on steep descents, such as the overheating of break blocks and the reduction of breaking distance, and their solution. Methods of choosing the best spans on the single- as well as double-track railways are proposed.

UDC 6815.015.22

C12.10. On the analysis of forced movements for a profile-grinding device. /Amkoladze Kh., Lomidze M., Dolidze M., Zedelashvili I/. Transport and Machine-building. – 2008. – #2(10). – pp. 109–114. – Rus. res.: Geo, Eng.

On the basis of earlier conducted studies for simplification of dynamic analysis problems, together with the initial complex nonlinear model, consisting of several differential and one transcendental algebraic equations, methods of construction of approximated mathematical models are presented. In order to investigate forced movements related to the work piece profiling error, the problem of constructing an approximated model interrelated to the linear coordinate of profiling displacements of the abrasive disk center is considered. The follow-up forced motion analysis problem is based on the application of the well-known model of succession application of frequency solutions. Analytic dependences determining frequency solutions of both the first and the second approximation that are requisite for analysis of the forced motions of machine system under study have been obtained.

UDC 625.11

C12.11. Determination of the weight rate of a freight train under mountain conditions. /T.Kupatadze, G.Kvantaliani, N.Kupatadze/. Transport and Machinebuilding. – 2008. – #2(10). – pp. 142–148. – Geo. res.: Rus, Eng.

The article deals with the determination of the weight rate of a freight train running under mountain conditions, during which of essential significance is to determine the constant of the driving-wheel's friction with the rail. It is characterized of a high rate of variability and depends on many factors, in particular, on the rail head condition, especially on the dirt and wet due to weather conditions. Solutions of the above problem with an emphasis on mountain conditions are proposed.

UDC 629.43

C12.12. Ways for improving the operation of Batumi transport junction. /A.Devadze, N.Kopinadze/. Economics and Business. – 2008. – #1. – pp. 158–171. – Geo. res.: Geo, Eng.

Batumi is one of the most significant junctions of railway, motor, air and marine transport in Georgia. The efficient operation of various transport means in the transport junction needs close interaction, the creation of relevant industrial links, the coordination of transport system operation, a single technology of mixed cargo freightage. The development of transport complex management methods in the transport junctions is expedient. The idea of establishment of a coordination council and the scheme of its structure is offered.

C13. Medicine. Healthcare

UDC 616-089:616.132.2-002

C13.1. The mid-term results of isolated coronary artery bypass graft operation. /G.Chapidze, S.Kapanadze, N.Dolidze, Zv.Bakhutashvili, E.Shengelia/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 7–16. – Eng. res. Geo.

According to the obtained data, on the basis of a preventive strategy and treatment, CABG has shown to have excellent mid-term results. It is associated with marked improvement in major clinical outcomes, survival, quality of life, depressive symptomatology, myocardial contractility and functional classes of heart failure. The present study is the first experience in our country. It proves the necessity of existence of the secondary coronary preventive system in hospitals performing CABG operations.

UDC 577.1

C13.2. Nanotechnology in life science. /M.M.Danielov, A.O.Sepper/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 17–25. – Eng. res. Geo.

Nanotechnology in life science is not so much about the science of manipulating matter on a nano-particles level, but most importantly is the science of using nano-quantities of biologically active substances in every precise way to imitate physiological processes occurring in a living organism MD SCIENCE/BIONOVA's technological advancement is based not on nano-particles, but on more sophisticated, more advanced and more natural for the human body approach– using a combination of biologically active substances in nano- and pico-quantities, targeted to the problem – specific biochemical pathway.

UDC 611-018.46

C13.3. Bone marrow analysis in critical patients. /Z.Kheladze, A.Phalavandishvili, Zv.Kheladze/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 26–29. – Eng. res. Geo.

A morphological study of a marrow punctate for determining the content of free nitric oxide and peroxide-radicals in the marrow of critical patients has been carried out. 27 adult critical patients of various geneses (sepsis, insult, trauma, etc.) were examined. All the patients were under artificial ventilation of lungs. The treatment consisted in the filling of water deficiency and correction of metabolism, the parenteral and enteral nutrition, antibiotic therapy, etc. The study has shown toxic granulosity in the marrow cells of the critical patients with an increase in the number of metamyelocytes against this background. A similar quantitative increase has been observed in respect of stab neutrophils, whereas the number of neutrophilic myelocytes has decreased. The number of lymphoid elements has also increased, the quantity of monocytes remaining unchanged.

UDC 616-004

C13.4. Phenomenon of „sclerosis” of T–lymphocytes in the terminal condition. /Z.Kheladze/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 36–44. – Eng. res. Geo.

The immune and toxic status of 73 patients in the terminal condition has been investigated. The study has demonstrated the terminal conditions to be associated with the secondary immunodeficiency syndromes, including the cellular and humeral components of the immune response, also that the toxins themselves possess the immunosuppressive effect and promote suppression of the T– and B–lymphocytes function. Especially important has been the ability of the T-lymphocytes to “forget” implementation of the anamnestic immune response. Endotoxins originated during the terminal condition have been suggested to play a significant role in the development of such “sclerosis”

UDC 616-001.4

C13.5. Application of plasma beams in the treatment of limb wounds resulting from mine explosion. /S.Jaini, B.Tsutskiridze, Z.Kheladze, Zv.Kheladze/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 45–49. – Eng. res. Geo.

The article deals with a new method of treating limb wounds caused by mine explosion with plasma beams. The advantage of the method is corroborated by a 20% reduction of complications from the suppurative and septic inflammation. Other benefits of the method are its simplicity, reliability and reduction of the time of surgical debridement of the wounds. The method makes it possible to apply plasma beams at any stage of the treatment of explosion-caused wounds.

UDC 616.12-008.311

C13.6. The effect of ventricular tachycardia proceeding with retrograde dissociation of atriums on cardiohaemodynamics. /R.N.Shonia., G.S.Shonia/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 50–59. – Eng. res. Geo.

The article deals with the effect of ventricular tachycardia proceeding with retrograde dissociation of atriums on cardiohaemodynamics in critical patients and in an experiment. The Doppler echocardiography, different modes of cardiac pacing, catheterization of the heart and main vessels, electromagnetic blood flowmeter and angiocardiology were used. The study results have completely changed the earlier existing views on the so-called “asynchronous functioning” of the ventricular tachycardia proceeding with retrograde dissociation of atriums.

UDC 616.24-002

C13.7. The treatment of pneumonia by plasma rays in critical patients. /Z.Kheladze, S.Jaini, B.Tsutskiridze, Zv.Kheladze/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 76–83. – Eng. res. Geo.

The study aims at generalizing the first experience of using the plasma rays in the treatment of pneumonia in critical patients. The plasma radiation sessions used to be applied to the patients once or twice a day in the presence of absolute indications. The course of treatment included 5 – 7 radiation sessions, the radiation being effected on the projection surface of both lungs. The study results indicate good prospects of applying the method in the treatment of pneumonia in critical patients.

UDC 616-08C13.8. Critical care medicine with limited resources. /Z.Kheladze, N.Marshania, E.Kartsivadze, Ts.Kharaisvili/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 83–91. – Eng. res. Geo.

The article discusses differences between treatments at critical care medicine services with restricted and unrestricted resources. The measures to save restricted resources are dealt with.

UDC 608.3

C13.9. Bibliometric and patent analysis of nano-technological processes. /T.Kachibaia, E.Rauppl/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 91–103. – Eng. res. Geo.

The growing number of patents and publications in the sphere of nanotechnology is the main indicator of its importance. The statistics produced by Thomson Derwent show that whilst there was a sudden rise in journal papers on nanotechnology beginning in the mid-1990s, patent applications did not start to accelerate until 1998. From that time, however, huge yearly jumps have been recorded, from around 500 in 1998 to nearly 1,300 in 2000. All of which is putting patent offices under strain.

UDC 616-006.466

C13.10. Correction of NO-inducible apoptosis with plaferon LB in the Jurkat cells culture. /M.Khizanishvili, M.Shakarashvili/. Critical Care & Catastrophe Medicine. – 2007. – #3. – pp. 105–114. – Eng. res. Geo.

The purposes of the investigation were: (i) to create a model of NO-inducible apoptosis in Jurkat-cells culture; (ii) to determine the changes of oxidative stress intensity, free NO, nitrated complexes (originated in the process of NO's interaction with heme-containing and heme- noncontaining proteins of respiratory chain) and mitochondrial respiration; (iii) to estimate the dynamics of changes in the mitochondrial membrane potential (DY); (iv) to estimate the redistributinal changes of cycle phases of cells; (v) to determine the ultra-structural changes in cells; and (vi) to estimate several mechanisms of influence and efficiency of Plaferon LB on NO-inducible apoptosis in Jurkat cells culture.

UDC 615.015

C13.11. A new antipyretic - phytopreparation Tiol. /M.Bakhtadze, V.Khvedelidze, V.Kvantidze/. /Novation. – 2008. – #1. – pp. 69–74. – Rus. res.: Geo, Rus, Eng.

The pharmacological action of *Tiol* has been studied on chemical and thermal burn models against the preparation *Aekol*. Sunflower seed oil was used as placebo. The burn healing action of *Tiol* was studied on white underbred male mice weighted 120–140 g. The preparation was found to be more effective against *Aekol*, showing faster healing of the burns artificially caused by application of acetic acid.

D. INTERSECTORAL PROBLEMS

D1. Organization and Management

UDC 339.138

D1.1. Sales and strategic marketing. /I.Gabadadze, S.Nemsadze, N.Mushkudiani, I.Tsereteli/. Novation. – 2008. – #1. – pp. 97–99. – Geo. res.: Geo, Rus, Eng.

The article deals with the sales-oriented business case with high level of competition. In order to make the sales-related activity of a company efficient, it shall be based on strategic marketing plan to consist of the following stages: definition and analysis of the market; analysis of the potentialities and risks of the strengths and weaknesses of competitors; statement of objectives; increasing the potential of sales; design of the best strategy; drafting of a marketing program.

UDC 629.113/115

D1.2. Organization and methods of car brushing and washing operations. /O.Gelashvili, T.Niauri, N.Paiashvili/. Transport and Machine Building. – 2008. – #2(10). – pp. 5–11. – Rus. res.: Geo, Eng.

The traditional approach to car brushing and washing provides only cosmetic car washing and fails to take into account recommendations on regularity of such operations, as well as to regulate their labor intensity and interrelation to the actual maintenance conditions. The work considers the necessity of car brushing and washing operations, proposes methods of their conduct as well as discusses other issues in connection with the above.

UDC 338.1:626.86

D1.3. Principles of the formation and functioning of the Association of Water Users. /M.Vartanov, V.Samkharadze, L.Kekelishvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 62–67. – Geo. res.: Geo, Rus, Eng.

The necessity of forming a market of water resources is substantiated as well of setting up and propagation of associations of water users as one of the subjects of the water resources market are proposed. The necessity an active involvement of farmers in the management of the reclamation infrastructure is demonstrated. Following the example of Akhmeta region association *Tsiskara*, a business plan of the reclamation association is given.

D2. Environmental Protection. Ecology

UDC 632.95

D2.1. The application of microorganisms isolated from investigated soils for disactivation of pesticides. /Z.Chankseliani, Ts.Sikharulidze, E.Bibiluri, D.Razmadze, M.Bibiluri/. Radiological and Agroecological Researches. – 2008. – v.III. – pp 32–34. – Geo. res. Eng.

On the basis of a quantitative determination and identification, a complex of microorganism cultures was applied for deactivation of pesticides under laboratory conditions. The results showed that the deactivation process of pesticides can be conducted by proper selection and preservation of desirable conditions.

UDC 551.577.38

D2.2. Method of prediction of summer droughts in Georgia. /T.Turmanidze, M.Gigilashvili, L.Megrelidze, N.Chikhradze/. Radiological and Agroecological Researches. – 2008. – v.III. – pp. 59–67. – Geo. res. Eng.

A method of seasonal prediction droughts based on a correlation dependence of spring weather conditions and summer drought phenomena has been developed for the conditions of Georgia. The obtained regression equations make it possible to calculate with the acceptable precision the expected temperature (10%), precipitation (20%) and the moisture factors in advance of 2 and more months.

UDC 502.(207)

D2.3. Some zoosanitary and veterinary activities for the ecological safety of the biosphere. /K.Mikadze, G.Mamatsashvili/. Radiological and Agroecological Researches. – 2008. – v.III. – pp. 74–78. – Geo. res. Eng.

The work deals with a set of zoosanitary and veterinary complex activities that have been worked out to fight against the cattle tuberculosis and brucellosis, the introduction of which may contribute to the abolishment of unreliable foci and preservation of the biosphere.

UDC 551.311.21

D2.4. Prediction and assessment of erosional mudflow processes in the catchment basin of the White Aragvi. /G.Gavardashvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 22–32. – Geo. res.: Geo, Rus, Eng.

With a view to predicting the erosional–mudflow processes in the river basin of the White Aragvi and taking into account the theoretical and field investigations, the principal hydrologic and hydraulic indices of typical water–courses have been studied. The following have been established: the coefficients of erosion of mountain slopes, with account of the degree of slope damage; forms of front of mudflow taking shape on the river Mletis Khevi; the granulometric and chemical composition of the mudflow mass.

UDC 631.4: 551.3

D2.5. The influence of reservoirs on adjoining ecosystems and mathematical modeling of these processes. /G.Grigolia, D.Kereselidze, V.Trapaidze, G.Bregvadze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 36–39. – Geo. res.: Geo, Rus, Eng.

Construction and exploitation of reservoirs and regulation of river runoff with their help is an achievement of any country, including Georgia. Reservoirs affect adjoining ecosystems, and mathematical modeling of these processes is an important stage. From this viewpoint the reservoir “Dalis mta” – important for Georgia – is discussed. The preservation of unique forest tracts in the tailrace depends on the regime of its functioning. The investigations have shown that the influence of the reservoir on the adjoining ecosystems is basically positive.

UDC 541.1(07)

D2.6. Assessment of the chemical characteristics of the pollution of the surface waters of Lake Paliastomi from the ecological point of view. /I.Zakaidze, V.Shurgaia/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 71–76. – Geo. res.: Geo, Rus, Eng.

The paper discusses the mean and annual indices of the chemical pollution of the surface waters of Lake Paliastomi, their maximally permissible concentrations and attendant hazardous and super hazardous phenomena. The causes of the pollution of the lake freshwater are also discussed.

UDC 624.131.577.4

D2.7. Assessment of the vulnerability and safety of the Black Sea. /I.Iordanishvili, K.Iordanishvili, T.Akhvlediani, E.Khosroshvili, Kh.Kiknadze, I.Makharadze, V.Nadibaidze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63 – pp. 95–101. – Geo. res.: Geo, Rus, Eng.

The authors have analyzed the data on the pollution of the Black Sea based on the material gathered by various scientific expeditions of Ukraine, Bulgaria, Turkey, Russia and Georgia. The techniques of the reliability theory and the theory of stochastic problems on which basis the critical pollution of the Black Sea is assessed has been applied.

UDC 669.018.674

D2.8. Dynamics of heavy metal distribution in soils and natural waters of mining and metallurgical regions. /Z.Svanidze, O.Mikadze, B.Gogichaishvili/. Energy. – 2008. – #3(47). – pp. 18–26. – Rus. res.: Geo, Eng, Rus.

The work presents an analysis of soil and water pollution in a unique region hosting a manganese deposit and metallurgical production of ferroalloys on a small territory. The possible pollution sources are traced throughout the entire production cycle – ore mining, transportation to dressing plants, dressing technologies, transfer of concentrates to the ferroalloy plant and their metallurgical processing. The work comprised hydro geochemical field studies – measuring water point regime parameters, selecting surface and underground water samples, as well as soil samples, from different areas of main river basin, potable water wells in populated areas, sown areas, wine plantations and pastures, and other types of land. For defining the quantitative indices of heavy metal distribution in industrial ecosystems, a microcomponent analysis of water and soil (chemical, atomic-adsorption) with determination of composition of 8 microelements – Cu, Zn, Cd, Fe, Mn, Co, Ni, Pb was carried out, as well as a detailed picture of the pollution degree of the region – depicted. The actual contents of heavy metals exceed corresponding average indices of the world rivers in hundreds and thousands times. It was determined that the content of metals in river waters steadily and gradually decreases with an increase of distance from the pollution source, depending on a migration ability of a specific element in the water environment. However, heavy metal transport by river water takes place throughout long distances. The background contents of metals in river waters, even beyond pollution source impact area, are quite high. A mathematical model of polluting dust lifting, transport through wind flows and exhaust into the atmosphere is elaborated. A device for cleaning the natural water polluted by heavy metals is proposed and tested in semi-industrial conditions, using two types of natural sorbents, the deposits of which are largely presented throughout Georgia.

D3. Statistics

UDC 311.312.061

D3.1. On the status and authority of an official statistical organ. /D.Kbiladze, Sh.Metreveli/. Kommersanti. – 2008. – #1(5). – pp.71–74. – Geo. res.: Rus, Eng.

The article deals with the present inappropriate status of the Georgian official statistical body and authority in directing independent production process. Specific proposals for independent functioning of this body which will make the information prepared about the economic, social, ecological and demographical spheres more reliable and applicable for appropriate managing of decision making process are made.

D4. Other Intersectoral Problems

UDC 625.57

D4.1. Mathematical model of a manganese prospect supply tractor. /T.Javakhishvili, T.Kokaia/. Transport and Machine Building. – 2008. – #2(10). – pp. 115–122. – Geo. res.: Rus, Eng.

The developed mathematical model of a tractor is given in a form of supplying functions considering the tractor system parameters and distribution in time and space. On the basis of admission and considering the small length of the tractor, a two-mass system model with various parameters is accepted in both cases. A specific model choice will take place at the stage of the system's mounting. The developed mathematical model can be applied for transporting equipment (rope-way, manipulator, cable conveyor, etc) with considerably small length of elastic tractor element.

UDC 551.531.6.524

D4.2. Investigation of erosional and mudflow phenomena through the use of aerospace information. /G.Dokhnadze, R.Diakonidze, I.Pirtskhalaishvili D.Mosulishvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 46–53. – Geo. res.: Geo, Rus, Eng.

The paper deals with the erosional–mudflow phenomena occurring on the northern slope of the Lomisi Ridge of the Tetri Aragvi catchment area. The findings of aerospace photography and topographic maps are used in the process of investigations. The hydrological and morphometric characteristics of the catchment areas of mudflow water–courses as well as the results of prognostic calculations of the maximum discharges of a turbulent mudflow of 1 per cent provision are presented.

UDC 551.466

D4.3. On theoretical prediction of waves in the riverside zone of mountain reservoirs. /I.Iordanishvili, E.Khosroshvili, Kh.Kiknadze/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 110–118. – Rus. res.: Geo, Rus, Eng.

The available studies of prediction of choppiness in the riverside zone of reservoirs are analyzed. As a result of solving a one–dimensional equation of shallow water in the shape of Bessel function, the possibility of predicting the height of a transforming wave and the height of the waves rolling against the slopes in the linear theory within the depth of slope $\alpha = 5^0 \div 30^0$ is presented.

UDC 631.4.551.3

D4.4. On a problem of modeling surface irrigation. /G.Chitishvili, L.Kekelishvili/. Scientific Works of the Georgian Institute of Water Management. – 2007. – #63. – pp. 193–200. – Geo. res.: Geo, Rus, Eng.

The work deals with the possibility of identification of some basic characteristics of surface irrigation and of planning the ways of solving the optimization problems by using a variable-mass water stream hydraulic model and an analysis of the ultimate picture of flow processes and experimental data.

UDC 621.643/644

D4.5. On the problem of calculation of a pressure fall in form losses. /G.Gigiberia/. Energy. – 2008. – #3(47). – pp. 27–32. – Geo. res.: Geo, Rus, Eng.

The rate of pressure fall in form losses under hydraulic calculation of pipelines is deemed to be so insignificant that could be assessed in several percentages of the losses on length (on friction). In addition, the engineering practice encounters cases when such pressure losses determine the design solution. This work aims at selecting a type of valve and such form loss that condition pressure reduction from 120 meters. The formulas of Altshoul and Bord have been found to provide different calculation results. The taking into consideration of the kinetic energy of the current has demonstrated that the mentioned formulas fail to obtain a correct, single–value answer. Apparently, the existing contradiction in the calculation results can be explained by defective measurements in the experiments of kinetic energy of the current when passing the form losses. The above enables to conclude that the valve sizes must not be chosen according to the hydraulic loss factor. This function should be entrusted to a diaphragm mounted on the pipeline, whose diameter is to be selected by the pressure measurement immediately after the diaphragm.

UDC 519.688

D4.6. The solution of respective algorithm of a symmetric problem by using an analytical–numerical method of large–size blocks and the results of its numerical implementation. /A.Chrelashvili/. Energy. – 2008. – #3(47). – pp. 39–46. – Geo. res.: Geo, Rus, Eng.

The work deals with a problem of determination of the deflected mode of large–size blocks by using an analytical–numerical method based on a joint use of methods of splicing the fictitious, orthotropic systems and finite elements. The ways of obtaining an expression for the splicing components of tension and relocation are shown. An explanation how to make a system of common algebraic equations for the given problem, the solution of which stipulates a possibility of determination of components of tension and relocation for the blocks is given. The results of the numerical implementation are shown in the attached drawings.

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