

### **ASSESSMENT OF THE INFORMATION AND COMMUNICATION TECHNOLOGY DEVELOPMENT INDEX AND THE ANALYSIS OF THE OBTAINED RESULTS**

**Zumberidze O.G., Gochoshvili T.G. and Abzianidze E.E.**

**Georgian Technical University**

The methodology for evaluation of the Information and Communication Technology Development Index is reviewed: imputation of missing data, normalization of data, weighting and aggregation and sensitivity analysis. The ICT access, use and skills indicators are evaluated using these methods. Based on the analysis of the obtained results, the ICT development index is calculated, which indicates the position of the country at a global level.

**Keywords:** Information and Communication Technology, ICT Development Index (IDI), ICT access, ICT use, ICT skills, ICT readiness, ICT intensity, ICT impact.

### **ON THE ANALYSIS OF WEAK POINTS OF THE INFORMATION SYSTEM AND THE ASSESSMENT OF SYSTEM ARCHITECTURE**

**Gelovani V.P. and Bosikashvili Z.V.**

**Georgian Technical University**

In the scope of the project on the analysis and assessment of weak points of software, based on the proposed formalism, it is devised to develop the software base (framework) of the analysis of weak points of the information system which should represent part of a single security management system. Hence the architecture of the whole system is presented.

**Keywords:** information system, software, architecture, assessment, security system.

### **MODERN VIEW OF THE BUSINESS MODEL AND THE SYSTEMS ANALYSIS OF THE COMPONENTS**

**Khutsishvili S.A., Khartishvili M.P., Khutsishvili G.S. and Khutsishvili L.S.**

**Georgian Technical University; Iv. Javakhishvili Tbilisi State University**

The paper describes important tools for analyzing, evaluating, researching and developing business activities and general characteristics of the business model. The focus is on business model developed by A. Ostwalder and I. Pinel, on its structure and peculiarities. The main problems of processing of business model “blocks” and structuralization of supporting elements as well as the possible interconnection between the “blocks” and the consistent process of realization are discussed.

**Keywords:** business model, canvas, pattern, valuable proposal, user segment, distribution channels, spending, income.

### **DIFFERENCE BETWEEN DEDICATED AND CLOUD SERVERS**

**Japaridze D.V., Sulkhaniashvili S.V. and Joglidze M.Z.**

**The University of Georgia**

The paper deals with the difference between dedicated and cloud servers. According to real examples, the dedicated server generally provides greater performance and reliability with lower costs than current cloud service options. Cloud servers are the best choice to take the advantage of full scalability, high availability, redundancy, security, and elasticity that the infrastructure can offer.

**Keywords:** database, dedicated servers, cloud, performance.

### **ANALYSIS OF THE RELIABILITY OF A GAS DISTRIBUTION SYSTEM USING MARKOV PROCESSES**

**Namgaladze D.P., Shatakashvili L.A. and Gagua G.G.**

**Georgian Technical University**

Reliability and efficiency are main requirements to the gas distribution system. Technological reliability of gas distribution systems is a complex problem, which requires simultaneous consideration of the reliability of the components of the gas distribution network and special technological schemes of networks. When considering the problem of reliability of the gas distribution network, we often deal with a recoverable system (or its element), which can be described using the Markov process. In the article, the Markov process with three states and generally derived analytical expressions is considered. For clarity there is considered, for instance, the time expectation state is considered.

**Keywords:** gas distribution network, reliability, Markov process.

### **THE COEFFICIENT OF EFFICIENCY OF THE MAIN OIL PIPELINE**

**Namgaladze D.P. and Tsivkarashvili G.N.**

**Georgian Technical University**

The aim of the work is to determine the values and factors that affect the significant impact and determine the efficiency of main pipeline. The statement has been obtained which shows us amount of energy that transmit from turbo

mechanism to pipeline. Has been explained useful compiler that provides speed by head. Also is reviewed one of the most important factor in energy efficiency, the pipeline economically substantiated internal diameter. An example is given which shows the change of efficiency during the change in the internal diameter of the pipeline. With examples have been shown the dynamics how is changing the resistance coefficient and relevant values of the corresponding efficiency on the different position of the pipeline armor.

**Keywords:** coefficient of efficiency, main oil pipeline.

#### **INCREASING OF THE IMPACT VISCOSITY OF WELDED JOINTS OF MAIN PIPELINES BY ALLOYING THE WELD METAL IN ARC-WELDING**

**Kipiani P.N., Mindadze S.O. and Geradze P.T.**

**Akaki Tsereteli State University, Kutaisi**

The article considers the possibility of increasing the impact viscosity of the weld metal when the multi-arc welding of large-diameter pipes is carried out with application of different welding materials, in particular the powder-like wire alloyed with titanium and boron. The optimal content of these elements, which provides high-impact viscosity of the weld metal, was determined.

**Keywords:** multi-arc welding, impact viscosity, welded joint, weld metal, pipeline.

#### **CHARACTERISTICS OF CHEMICAL ADMIXTURES FOR CONCRETE**

**Baliashvili G.I., Sarjveladze N.V., Rukhadze T.A. and Tkemaladze L.V.**

**Grigol Tsulukidze Mining Institute**

Characteristics of modern chemical admixtures for concrete and the overview of their positive effects are presented. It is noted that the chemical admixture is a composite, an artificial material and one of the essential ingredients of the concrete. It is used for improvement of the properties of concrete and long-term safe exploitation of buildings. The classification of chemical admixtures for concrete is given. It is noted that, when choosing the chemical admixture for concrete, its dosage and relationship with other ingredients should be taken into consideration.

**Keywords:** concrete, chemical admixture, classification.

#### **OVERVIEW OF THE METHODS OF MANUFACTURING OF FROST-RESISTANT CONCRETE**

**Baliashvili G.I., Sarjveladze N.V. and Shapakidze E.V.**

**Grigol Tsulukidze Mining Institute; Iv. Javakishvili Tbilisi State University; Alexander Tvalchrelidze Caucasian Institute of Mineral Resources**

The overview and analysis of the methods of manufacturing of frost-resistant concrete is presented. It is noteworthy that the use of the frost-resistant concrete mixture and hardened concrete is essential where penetration of water and freezing-thawing of concrete take place. Depending on the climatic conditions, such situations can occur during the construction and exploitation of building structures in the Ninotsminda and Stepantsminda municipalities.

**Keywords:** concrete mixture, hardened concrete, frost resistance, freezing-thawing, building-structures.

#### **THINKING OF THE UNUSUAL PHENOMENON**

**Kadagishvili L.G.**

**V. Chavchanidze Institute of Cybernetics; Georgian Technical University; Georgian Engineering Academy**

The article deals with the research of thinking of the unusual phenomenon who is characterized by the depth of intuition unusual for an ordinary human. The higher essence of phenomenon's cognition of the unknowable consists in the depth of intuition. The phenomenon's properties generated by intuition are so different from the norm that they give her the qualities described as "clairvoyance". Her major quality is the ability of localization of a disease in the human organism and its curing with the help of own biofield.

**Keywords:** biofield, healer, dreaming.

#### **ON THE RELATIONSHIP BETWEEN GLACIATION AND THE CONTENT OF CARBON DIOXIDE IN THE ATMOSPHERE**

**Makhsradze A.I.**

**Akaki Tsereteli State University, Kutaisi**

The content of carbon dioxide in the atmosphere does not explain the glaciation on the Earth, as S. Arrhenius and T. Chamberlain thought. The foci of the formation of glaciation are associated with geocentric eras of the development of the Earth's mobile belts and concurrent epeirogenic uplift of the bordering solid substrate.

**Keywords:** glaciation, the content of carbon dioxide, atmosphere, Earth's mobile belts.

#### NUMERICAL MODELING OF ZESTAFONI CITY DUST DISTRIBUTION IN CASE OF BACKGROUND WESTERN WIND

Gigauri N.G., Gverdtsiteli L.V., Surmava A.A. and Intskirveli L.N.

Georgian Technical University; Institute of Hydrometeorology of Georgian Technical University

Dust distributions of Zestafoni city in cases of the background weak, mean and strong western winds with the use of regional model of atmospheric process development in the Caucasus and non-stationary three-dimensional equation of transfer-diffusion of passive admixtures are studied.

**Keywords:** numerical modeling, air pollution, dust distribution.

#### MODELING OF DUST DISTRIBUTION ON THE SOIL SURFACE OF ZESTAFONI CITY

Gigauri N.G., Gverdtsiteli L.V., Surmava A.A. and Intskirveli L.N.

Georgian Technical University; Institute of Hydrometeorology of Georgian Technical University

The distribution of dust on the soil surface of Zestafoni City and its surrounding areas was studied by numerical integration of atmospheric air-pollutant transfer-diffusion equations in the case of the prevailing background winds.

**Keywords:** modeling, dust distribution, soil.

#### AUTOMATED CONTROL SYSTEM FOR MONITORING THE WASTEWATER OF MINING AND MINERAL PROCESSING ENTERPRISES

Iashvili N.G., Tkemaladze G.Sh., Bibileishvili D.V., Makhashvili K.A. and Dolidze A.V.

Georgian Technical University

A new automated control complex (system) for monitoring and management of wastewater is offered. The main attention is paid to the continuous sampling and sample transportation line. The use of a computer allows carrying out complex analyses, e.g. titration, and displaying the obtained results on the monitor. The offered system controls the wastewater flow in rivers, lakes and reservoirs, and generates the signal stopping the wastewater flow in case of excess of the maximum admissible concentration (MAC). In emergency cases, temporary shutdown of the enterprise is possible.

**Keywords:** automated control system, wastewater, environmental pollution, maximum admissible concentration.

#### EXPERTISE OF HIGH-MOLECULAR COMPOUNDS BY MEANS OF NUCLEAR $^{13}\text{C}$ - $\{^1\text{H}\}$ MAGNETIC RESONANCE

Ormotsadze N.Sh. and Bibileishvili D.V.

A.Tsereteli State University, Kutaisi; Georgian Technical University

By means of nuclear  $^{13}\text{C}$ - $\{^1\text{H}\}$  magnetic resonance, the process of the synthesis of polynaphthalenebenzimidazoles and poly-n,n'-tereftaloil-N-methylhydrazide-1,3,4-oxadiazoles was studied. This method allows both the identification of polymers and determination of the composition of synthesized compounds via the integral intensities of the spectra.

**Keywords:** high-molecular compounds, synthesis, identification, nuclear magnetic resonance.

#### ELABORATION OF THE TECHNOLOGICAL PROCESS OF THE METHOD OF ELECTRODIALYSIS FOR LEAD CROCOITE WASTE WATER TREATMENT

Chkhubianishvili N.G., Mamulashvili M.A., Mchedlishvili G.S. and Kristesashvili L.V.

Georgian Technical University

The paper deals with the treatment of lead crocoite waste water with calcium hydroxide. The optimum quantity of calcium hydroxide was determined. The optimum conditions of filtered waste water purification via electro dialysis after treatment and the limiting concentration of polarization were studied. The purified water meets the requirements to technical water.

**Keywords:** lead crocoite, electro dialysis, waste water treatment, optimum conditions.

#### DETERMINATION OF THE LIMIT CONCENTRATION FOR THE CONCENTRATE COMPARTMENT SOLUTION

Chkhubianishvili N.G., Mamulashvili M.A., Mchedlishvili G.S., Kristesashvili L.V. and Kurtskhalia Ts.S.

Georgian Technical University

The level of limiting polarization of the salt solution concentrate in case of the total content of components of lead crocoite waste water was studied. It was found that chromate contained in the waste water is precipitated in the electro dialyzer membrane. To avoid the precipitation, hexavalent chromium was converted into trivalent one through treatment of the solution with hydrogen peroxide. The level of solution polarization was determined.

**Keywords:** lead crocoite, electro dialysis, membrane, concentration.

**SPECTRAL CHARACTERISTICS OF THE PRODUCTS OF AMINOMETHYLATION OF 2-ETOXYCARBONYL-5-(P-NITROPHENYLTHIO)INDOLE****Megrelishvili N.Sh., Chikvaidze I.Sh. and Samsoniya Sh.A.****Akaki Tsereteli State University, Kutaisi; Iv. Javakhishvili Tbilisi State University**

The composition and the structure of synthesized compounds 3-dimethylaminomethyl-2-ethoxycarbonyl-5-(p-nitrophenylthio)indole, 3-N-piperidinomethyl-2-ethoxycarbonyl-5-(p-nitrophenylthio) indole and 3-N-morpholinomethyl-2-ethoxycarbonyl-5-(p-nitrophenylthio)indole were determined based on the data of the elemental analysis and IR, UV and PMR spectra.

**Keywords:** indole compounds, aminomethylation, spectral characteristics.**SPECTRAL CHARACTERISTICS OF SOME 3-ACYLDERIVATIVES OF 2-ETHOXYCARBONYL-5-(P-NITROPHENYLTHIO)INDOLE****Megrelishvili N.Sh., Chikvaidze I.Sh. and Samsoniya Sh.A.****Akaki Tsereteli State University, Kutaisi; Iv. Javakhishvili Tbilisi State University**

The article discusses some spectral parameters which prove the structures of previously synthesized 3-formyl-2-ethoxycarbonyl-5-(p-nitrophenylthio)indole, 3-acetyl-2-ethoxycarbonyl-5-(p-nitrophenylthio)indole and 3-acetyl-2-oxycarbonyl-5-(p-nitrophenylthio)indole.

**Keywords:** indole, derivatives, spectral characteristics.**MATHEMATICAL-CHEMICAL INVESTIGATION OF URANIUM CHLORIDES****Georgadze K.P. and Gverdtsiteli M.I.****Iv. Javakhishvili Tbilisi State University**

The mathematical-chemical investigation of uranium chlorides was carried out within the scope of the GANB-matrices method. Two correlation equations were derived. The correlations are satisfactory.

**Keywords:** uranium chlorides, GANB-matrix, correlation equation.**MATHEMATICAL-CHEMICAL INVESTIGATION OF AB<sub>4</sub> TYPE MOLECULES WITHIN THE SCOPE OF THE GANB-MATRICES METHOD****Gverdtsiteli M.I., Lobdjanidze T.E. and Totladze K.T.****Iv. Javakhishvili Tbilisi State University**

Titanium tetrahalides were investigated within the scope of the GANB- matrices method. Two correlation equations were derived. The correlations are satisfactory.

**Keywords:** titanium tetrahalides, GANB-matrix, correlation equations.**TOPOLOGIC INDICES – EFFECTIVE CONSTRUCTIONS OF MATHEMATICAL CHEMISTRY****Gverdtsiteli M.I. and Chikvaidze N.I.****Iv. Javakhishvili Tbilisi State University; Sokhumi State University**

Topologic indices as effective constructions of mathematical chemistry are presented. Three topologic indices

$\lg(\Delta_{ANB})$ ,  $\lg(\Delta_{\tilde{A}NB})$  and  $\lg(\Delta_{GANB})$  are discussed.

**Keywords:** topologic indices, correlation.**INVESTIGATION OF CAN TYPE MOLECULES WITHIN THE SCOPE OF GANB-MATRICES METHOD****Gverdtsiteli M.I. and Lobzhanidze L.V.****Iv. Javakhishvili Tbilisi State University; Ivane Beritashvili Center Of Experimental Biomedicine**

Three uranium oxides were investigated within the scope of GANB-matrices method. The correlation equation was derived and studied. The correlation is satisfactory.

**Keywords:** uranium oxides, GANB-matrices, correlation equation.**THE STUDY ON CONDENSATION REACTIONS OF MONOSES AND KETONES USING QUANTUM-CHEMICAL MODELING****Pachulia Z.V., Tabatadze L.V., Sidamonidze N.N. and Chikovani A.F.****Sukhumi State University; Iv. Javakhishvili Tbilisi State University**

The article reviews the diagnostic mechanism of the reaction of  $\beta$ -D-fructopyranose with two-molecule acetone condensate. It is shown that activation energy with the given scheme is  $\Delta\Delta H^\ddagger = 1136.4$  KJ/mole, and reaction heat is

$\Delta\Delta H = -88.45$  kJ/mole. The activation energy of the element is  $\Delta E^\# = 81.17$  kJ/mole, which means that the obtained value corresponds to the energy characteristics of chemical reactions.

**Keywords:** condensation reaction, monoses, ketones, quantum-chemical modeling.

#### QUANTUM-CHEMICAL MODELING OF THE SYNTHESIS OF ISOPROPYLENE PRODUCTS OF SUGARS

**Tabatadze L.V., Pachulia Z.V., Sidamonidze N.N. and Chikovani A.F.**

**Iv. Javakhishvili Tbilisi State University**

The paper deals with the diagnostic mechanism of the interaction between  $\alpha$ -D-glucofuranose and two acetone molecules. It is shown that the activation energy is  $\Delta\Delta H^\# = 1187.01$  KJ/mole, and the reaction heat is  $\Delta\Delta H = -37.16$  kJ/mole. The activation energy of the element is  $\Delta E^\# = 84.79$  KJ/mole, which means that the obtained value corresponds to the energy characteristics of chemical reactions. Confirmation of the obtained result requires a fair experiment with the use of full synthesized products and application of more comprehensive non-empirical methods of the quantum-chemical computation.

**Keywords:** quantum-chemical modeling, synthesis, sugars, isopropylene.

#### TECHNICAL POSSIBILITIES OF THE USE OF TRADITIONAL NATIONAL ORNAMENTS IN KNITWEAR

**Abesadze N.M., Pailodze N.O., Vadachkoria Z.A. and Bakuradze K.E.**

**Akaki Tsereteli State University, Kutaisi**

The use of folk motives in creating images of modern clothing depends on its purpose. The color solution of the ornament on the surface of the knitted fabric is associated with the structure of the fabric. Colorful ornaments allow creating different compositions on the canvas. Technical improvement of knitting machines makes it possible to perform some finishing elements already in the process of knitting. In the course of work, we can use various possibilities of machine knitting: changing of yarn (color, texture); relief elements; weaving patterns, etc.

**Keywords:** knitwear, national ornaments, colorful composition.

#### THE ANALYSIS OF GEORGIAN FOOTWEAR CONSTRUCTION EVOLUTION WITH THE PURPOSE OF WORKING OUT THE PARAMETERS OF CONVENIENT FOOTWEAR

**Grdzeldze M.G. and Kiknavelidze L.G.**

**Akaki Tsereteli State University, Kutaisi**

Footwear production has a great historical heritage in Georgia. This is a traditional ancient occupation of our nation. Nowadays, the footwear with an ethno-elements is very popular, especially among young generation. There is a wish and aspiration to create an original footwear considering the centuries old traditions matched with the modern style, which will be convenient and perfect piece of work from the engineering point of view.

**Keywords:** construction of the footwear, convenience of the footwear, evolution of the construction, ethno-footwear.

#### THE RESULTS OF RESEARCHING THE ATTITUDE OF THE SOCIETY TO THE COMFORTABLENESS OF THE FOOTWEAR

**Grdzeldze M.G. and Kiknavelidze L.G.**

**Akaki Tsereteli State University, Kutaisi**

There are analyzed the result of social enquiry in the article, which confirmed once more, that the research and optimization of standard features of personal effects and implementation of the results in the manufacturing process is an important issue. The increasing demand of population on the comfortable production is dependent on the correct solution of it.

**Keywords:** construction of the footwear, convenience of the footwear, research of social opinion.