

SUMMARY

ON ONE METHOD FOR DETERMINATION OF THE NUMBER OF POINTS IN THE POLYGON DOMAIN WITH INTEGER COORDINATES

Maspindzelashvili B.I.

Georgian Technical University

The article deals with the method of determination of the number of points in the polygon domain with integer coordinates when the polygon sides are located on straight lines and their vertices are presented by intersection points of straight lines.

Keywords: convex polygon, coordinate plane, segment, straight line, coordinate, point.

SUMMARY

LABVIEW COMPUTER TECHNOLOGIES FOR EFFECTIVE IMAGE CODING (COMPRESSION)

Chkheidze I.M., Abzianidze N.E., Murjikneli G.G. and Gochoshvili T.G.

Georgian Technical University

The article discusses the expedience of using computer technologies for effective image coding. It shows how simple and clear it is to compress images in LabVIEW software environment using Fast Fourier Transformation. By the graphs, it is possible to evaluate theoretically the maximum value of the compression coefficient that corresponds to a certain permissible mean square error and subjective assessment of the quality of the obtained image.

Keywords: computer technologies, image coding, compression, fast Fourier transformation, LabVIEW.

SUMMARY

DEPLOYABLE METHOD OF DETERMINATION OF THE RESONANCE FREQUENCY OF AN OSCILLATORY SYSTEM AND ITS SPECIFIC FEATURES

Epitashvili I.Z.

Georgian Technical University

The article deals with the deployable method of determination of the resonance frequency of an oscillating system. Two variations of the method are considered: a) determination of the dependence of the transmission coefficient modulus on the frequency by points with subsequent interpolation of the amplitude-frequency response (AFR) of the oscillating system; b) obtaining of the panoramic image of the amplitude-frequency response by using an oscillator and an indicator device. The first variation has a number of drawbacks, while the second one is free of them. The second variation is characterized by good properties, though it also has its negative points, which is expressed in the decrease in accuracy under the effect of various factors.

Keywords: oscillating system, resonance frequency, deployable method.

SUMMARY

EXPERIMENTAL STUDY ON THE STRESS-STRAIN STATE OF A SOLID REINFORCED CONCRETE SLAB WITH ORTHOGONAL RIBS AND DOUBLE-SIDED VOIDS

Zambakhidze L.I. and Ninidze T.D.

Georgian Technical University

An experimental study of the stress-strain of a solid reinforced concrete slab with orthogonal ribs and double-sided voids was carried out. It was revealed that the floors of this kind are characterized by a small amount of concrete in comparison with traditional ones. Hence the weight of the building is reduced, which results in saving concrete and fittings.

Keywords: reinforced concrete, floor, solid structure, voided slab, structural floor chart, orthogonal ribs, stress-strain state.

SUMMARY

ON THE PROBLEM OF TRADITIONAL AND SEMIOTIC ORNAMENTS IN THE 20TH CENTURY ARCHITECTURE

Chubinidze T.G.

Georgian Technical University

The article discusses the return of the ornament in architecture, after the minimalist era of early modernism, follows its transformation, the use of semiotic tools of expression to replace the traditional applied décor with the notion of the entire building as an ornament, and provides both historical and recent examples of building structures becoming the ornamental compositions.

Keywords: architecture, semiotic ornament, ornamental composition.

SUMMARY

WAVE GEARWHEELS

Kakhiani M.R.

Georgian Engineering Academy

The article deals with a new design of a wave-toothed differential with a four-way gear using non-circular wheels. The equations for calculations of the functions of the differential position and ratio are given. The movements of the driven differential shaft with obtained different movements of the driven link are analyzed. There is presented the construction solution of wave gear using flexible generators due to which the wave gear design becomes simpler and the technical conditions of engaging of the teeth of flexible and rigid wheels.

Keywords: wave gear, wave-toothed differential, flexible wave generators, gears with non-circular wheels.

SUMMARY

THE IMPACT OF MAIN PIPELINE ENERGY TRANSIT ON GEORGIAN ECONOMY ACCORDING TO THE KEYNESIAN MULTICRITERIA

Tsiskaridze D.G. and Gegeshidze E.B.

Georgian Technical University

University of Georgia

The article deals with the macroeconomic impact of energy transit in Georgia. The effect of the total demand growth on economic processes is determined by using a multiplier. The basic formula of the multiplier was derived. Multiplier mutations with various macroeconomic variations are presented, in total 4 multipliers are given. Structural analysis of gross domestic product expenditures presented by the National Statistics Office of Georgia was carried out. Based on it, the variables included in the multiplier for Georgian economy were identified. Finally, the impact of the income from energy transit via pipelines on Georgian economy in 2012-2016 is assessed by using multipliers.

Keywords: energy transit, Keynesian multiplier, macroeconomic impact.

SUMMARY

AUTOMATED CONTROL COMPLEX FOR INDUSTRIAL MINING TRANSPORT

Makhashvili K.A., Goderdzishvili G.I., Iashvili N.G., Dolidze A.V. and Khartishvili M.P.

Georgian Technical University

Besides traditional transport (automobile and railroad), at mine industry other kinds of transport such as aerial tramways, hydraulic and pneumatic pipelines as well as conveyor transport are employed. The article deals with the development of a complex of tasks for automated control of industrial transport of various kinds for mining plants. Primary attention is given to the specificity of accomplishment of the tasks of account and analysis, and calculation of work schedules of specific transport.

Keywords: industrial transport, mining industry, automated control system.

SUMMARY

INVESTIGATION OF STRUCTURAL TRANSFORMATIONS IN SOME CARBON MATERIALS AT HIGH TEMPERATURES

Loladze N.T., Tserodze M.P., Gabunia V.M., Pkhaladze T.B. and Avalishvili Z.A.

Georgian Technical University

Changes in the structure of carbon materials - carbon black and graphite of the GMZ grade after heat treatment over the temperature range 1120-2200K were studied. The changes in the d_{002} degree of graphitization of γ_{002} and the sizes of the crystallites L_a and L_c were determined as a function of the processing temperature of the materials under study.

Keywords: carbon materials, structural transformation, graphitization, high temperature.

SUMMARY

ASSESSMENT OF THE RESOURCES OF THE VASHLOVANI-QUIBISI SITE OF THE BORJOMI MINERAL WATER DEPOSIT

Koroshinadze T.O.

Georgian Technical University

The study of the unique Borjomi mineral water started in the 30-ies of the XIX century. During the past period, the popularity of the Borjomi mineral water has been growing day after day and nowadays it is presented in more than 40 countries worldwide. The Borjomi mineral water deposit includes three independent sites. Those are: Likani, Central and Vashlovani-Quibisi. The study of the deposit regime confirms that these sites are independent from each other. The paper describes the history of the discovery of the Borjomi mineral water in the Vashlovani-Quibisi site and its subsequent development. The basic stages of studying the useful resources of the site, the current state and growth potential are characterized.

Keywords: mineral water, deposit, resources, assessment.

SUMMARY

ASSESSMENT OF THE IMPACT OF SPONTANEOUS LANDFILLS ON THE ECOSYSTEM ON THE TERRITORY OF EASTERN GEORGIA

Buachidze N.S., Chikviladze Kh.N., Gurguliani I.N., Shubladze E.Sh. and Kuchava G.P.

Institute of Hydrometeorology at the Georgian Technical University

The role of spontaneous landfills located in Eastern Georgia in the processes of pollution of adjacent territories was studied. Chemical, microbiological and physical-chemical analyses of soil and watersamples were carried out and main pollutants were revealed. The impact of spontaneous landfills on the ecosystem was assessed.

Keywords: spontaneous landfill, ecosystem, environmental pollution,

SUMMARY

THE METHOD AND TECHNOLOGY OF CLEANING THE WATER SURFACE FROM OIL POLLUTANTS

Razmadze M.T., Kiknadze G.G., Imnadze P.M., Getsadze T.S., Kvirikashvili Ts.I.,

Rostomashvili Z.I. and Ambardanishvili O.P.

Andronikashvili Institute of Physics, Iv. Javakhishvili Tbilisi State University

World oil consumption increases. Oil is transported between continents by maritime transport. According to statistical data, oceans and seas are polluted by 3 million tons of oil spilled per year, which represents the biggest ecological catastrophe. The work offers the methods and technology for rapid localization of such disasters, recycling of the waste and application of recycled products in everyday life.

Keywords: surface water, oil spill, oil pollution, oil waste, waste recycling.

SUMMARY

ANTIBACTERIAL NANOSILVER-CONTAINING COMPOSITES BASED ON THE BIODEGRADABLE MIXTURE OF POLYESTER AMIDE AND POLY-N-VINYL PYRROLIDONE

Tskhadadze Sh.A., Kupatadze N.O., Tugushi D.S. and Katsarava R.D.

Georgian Technical University

Institute of Chemistry and Molecular Engineering, Georgian Agrarian University

It was found that it is best to use the mixtures $C_5P_5A_{0.2}$ and $C_5P_5A_{0.1}$ containing low concentrations of silver nitrate for production of stable nanosuspensions containing AgNPs of a desirable size by the method of photochemical reduction in the presence of poly-N-vinyl-pyrrolidone and amino acid-based polyester amide as stabilizing agents. At the same time, in this case, we have a considerable economy of silver nitrate. The mixtures $C_5P_5A_1$ and $C_5P_5A_{0.5}$ containing high concentrations of silver nitrates turned out to be less effective. They produced unstable suspensions containing AgNPs of larger sizes.

Keywords: nanosilver, photochemical reduction, daylight, ethanol solution, biodegradable polyeter amide, poly-N-vinyl pyrrolidone, antibacterial nanocomposite.

SUMMARY

POLYCONDENSATION OF AMIDE MONOMERS WITH ALDEHYDE:

SYNTHESIS OF WATER-INSOLUBLE NITROGEN FERTILIZERS

Gugava E.D., Gelashvili N.S., Maisuradze N.A., Papava G.Sh., Gavashelidze E.Sh.,

Liparteliani R.G. and Khotenashvili N.Z.

Petre Melikishvili Institute of Physical and Organic Chemistry of

Ivane Javakhishvili Tbilisi State University

Polymerized carbamide is produced by polycondensation of carbamide with aldehyde. With a change in the molar ratio of initial monomers, there form polymers having different, both linear and spatial structure. To obtain linear polymers, targeted synthesis of polymers was carried out. In the obtained polymers, peptide bonds were retained. It was revealed that, in the case of a linear structure, microorganisms easily penetrate into the molecule, which facilitates biodegradation of polymers.

Keywords: polymerization, carbamide, ecology, biodegradation, polycondensation.

SUMMARY

INVESTIGATION OF THE DYNAMICS OF WATER ABSORPTION BY WHEAT GRAIN IN THE PROCESS OF SOAKING

Khutsidze Ts.Z., Pruidze E.G., Khvadagiani Kh.B. and Kutateladze A.D.

Akaki Tsereteli State University, Kutaisi

In recent years, with the aim of increasing the biological value of bread, special attention is paid to the production of bread from whole grains, as well as from bioactive grains. In the process of bioactivation of the wheat, special attention is paid to the soaking and germination of the grain. The intensity of water absorption by grain depending on the duration

of soaking was studied. The studies showed that intense water absorption in the grain occurs at the beginning of soaking, then the process proceeds with less intensity. In addition, an excessive increase in the amount of water for soaking promotes even more activation of already activated hydrolytic enzymes. Therefore, the soaking of wheat grain is recommended under the following conditions: hydromodule 1: 2 for 5-6 hours at 40°C.

Keywords: wheat grain, soaking, water absorption.

SUMMARY

POLYCONDENSATION OF AMIDE MONOMERS WITH ALDEHYDE: SYNTHESIS OF WATER-INSOLUBLE NITROGEN FERTILIZERS

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Keywords: wheat grain, soaking, water absorption.

SUMMARY

THE IMPACT OF PHYTOHORMONES AND PYRROLE-CONTAINING TETRACYCLIC COMPOUNDS ON POTATO AND BEETROOT GROWTH AND DEVELOPMENT

Tserodze Kh.O., Kukhaleishvili M.I., Maisuradze M.G. and Bulauri E.V.

Biotechnology Center, Georgian Technical University

The expected biological activity of 12 pyrrole-containing tetracyclic compounds we synthesized was assessed. These compounds were used in agriculture for growing potato and beetroot crops. The impact of these compounds and the plant growth regulator – indolyl acid (group of auxins) on the agricultural cultures - potato and beetroot during the period of vegetation is conserved.

Keywords: phytohormones, pyrrole-containing tetracyclic compounds, plant growth regulator, biological activity, agriculture.

SUMMARY

BIOLOGICAL PECULIARITIES OF *ORIGANUM VULGARE*

Kacharava T.O., Lobjanidze M.B. and Tkebuchava Z.R.

Georgian Technical University

Samtskhe-Javakheti State University

The experiments performed showed that wild plant species growing in the highlands of Racha contain more vitamin C, which is due to by the effect of ecosystem conditions parameters (the sum of active temperatures, the amount of sediments, soil fertility, etc.). Hence, while cultivating the plantations of *Origanum vulgare* L in farming conditions, the following factors should be taken into account: environment-soil-plant-fertilization, biological peculiarities of the plant, optimal technologies of reproduction should be selected for the relevant region, etc. In case of proper management of the processes, ecologically pure raw product with high productivity and standard content of pharmacologically active substances is obtained and the genetic resource of this unique plant is maintained.

Keywords: *Origanum vulgare* L., ecosystem conditions, genetic resource, pharmacologically active substances.

SUMMARY**ANALYSIS OF IMPORTED SACCHAROMYCETES****Shildelashvili I.L., Matiashvili Sh.I. and Buishvili G.T.****Jacob Gogebashvili State University, Telavi**

Currently yeasts are not produced in Georgia. They are mainly imported in a pressed and loose form, labeled *Saccharomyces cerevisiae*, which is the general name of wine yeasts, without mentioning of the species on the label. An experiment was performed to find out if there are thermophilic yeasts in the baked bread available on our market. Thermophilic yeast facilitates the penetration of microflora in the human body and damages it. Local natural *Saccharomyces* were studied with the aim to use them in wine-making, bread baking etc.

Keywords: *Saccharomyces*, thermophilic yeast, wine-making, bread baking.

**DYNAMICS OF CHANGES IN THE COMPOSITION OF MINERAL
SUBSTANCES IN THE MUST AND WINE**

Gamkitsulashvili Gia V., Gamkitsulashvili Gela V., Khositashvili M.L. and Mikiashvili M.A.

Jakob Gogebashvili Telavi State University

Abstract. Recently, the qvevri wine-making method has attracted great attention both of Georgian consumers and foreign specialists. The article discusses the dynamics of changes in the composition of mineral substances in the must and wine in vessels made from different materials. The comparative analysis of mineral substances showed that the changes in the composition of mineral substances in both vessels were caused by minerals contained in the vessel, the activity of constituent elements and by their circulation in wine. In both cases, the quantitative changes in mentioned elements, the reduction of mentioned mineral elements was due to their absorption by the solid portion of the pulp, precipitation and crystallization of potassium, sodium and calcium tartrates.

Keywords: wine-making, qvevri, mineral substances, dynamics of changes.

SUMMARY

**DYNAMICS OF ACCUMULATION OF PHENOLIC COMPOUNDS IN THE RED
GRAPES INTRODUCED IN GEORGIA**

Khositashvili M.L., Khositashvili T.V., Buishvili G.T., Chalataashvili S.E. and Katsitadze M.G.

Jakob Gogebashvili Telavi State University

The article deals with the dynamics of accumulation of phenolic compounds in the red grapes introduced in Georgia at different stages of its ripening. For research, eight introduced red grape cultivars were taken. Their technical characteristics (linear and volumetric) were determined by the Prostoserdov's method. The dynamics of quantitative changes in phenolic compounds was determined by the Glories method. The experiment revealed that the dynamics of growth of the grape berry volume is in direct proportion with the dynamics of accumulation of phenolic compounds in the berry.

Keywords: red grapes, phenolic compounds, accumulation, technical characteristics.

SUMMARY

**DEVELOPMENT OF THE BLOCK DIAGRAM OF THE MECHANISM FOR SIMULATION OF
EXPERIMENTAL WEARING SHOES**

Zakaraia M.M. and Maglakelidze T.A.

Akaki Tsereteli State University, Kutaisi

The article deals with the development of the block diagram of the device for testing shoes in laboratory. The proposed design is a crank-and-rocker mechanism providing the movement of the shoe last along a coupler curve. The mechanism has a simple structure, high accuracy and minimal inertia forces. The preliminary dimensions of the links were defined; and a plan of positions and a chart of the device were built.

Keywords: experimental wearing shoes, articulated four-bar linkage, coupler curve.

SUMMARY

THE EFFECT OF ANTI-SEPTICS AND SODIUM CHLORIDE ON RAWHIDE MICROFLORA

Lomtadze N.Z., Shalamberidze M.M. and Tatvidze M.I.

Akaki Tsereteli State University, Kutaisi

The article discusses the microbiological bases of conservation and storage of rawhide and the effect of antiseptics on rawhide microflora. In the experiment, antiseptics – sodium silicofluoride and paradichlorobenzene were used. It was revealed that sodium silicofluoride has high bactericidal properties, does not affect dermis negatively, provides long-term storage of the rawhide, etc. Paradichlorobenzene hinders the penetration of microbes into the skin and provides good preservation of its elements; it possesses high bacteriostatic ability.

Keywords: antiseptics, tanning raw materials, microbiology.

SUMMARY

ON THE ISSUE OF USING AND RECYCLING OF TEXTILE WASTE

Moseshvili T.M. and Tskhakaia K.R.

Akaki Tsereteli State University, Kutaisi

The major challenge of industrial ecology is to address the problem of solid waste utilization, especially of household refuse. The threat of environmental pollution can be reduced by maximizing the use of waste in manufacturing operations and producing new products for domestic and technical purposes. The paper discusses the issues of utilization and recycling of textile waste, and proposes their classification according to the following characteristics: fiber composition, origin, recycling methods of processing and the sphere of secondary use. Also, the paper describes the latest trends and achievements in the field of fiber regeneration, the dissolution of synthetic refuse and the formation of high-quality polymers.

Keywords: textile waste, recycling, utilization.