

SUMMARY

ASYMPTOTIC DISTRIBUTION OF EIGENFUNCTIONS AND EIGENVALUES OF BOUNDARY-CONTACT PROBLEMS OF THE OSCILLATION OF THE HEMITROPIC THEORY OF ELASTICITY

Bezhushvili Yu.A.

Georgian Technical University

The article deals with basic boundary oscillation for the three-dimensional piecewise-homogeneous elastic hemitropic medium. The formulae problems of for distribution of eigenfunctions and eigenvalues of the problems considered were derived.

Keywords: hemitropic medium, theory of elasticity, oscillation, eigenvalues, eigenfunctions, asymptotic distribution.

SUMMARY

DYNAMICS OF FORCED MOVEMENT OF TRACKING SYSTEMS

Goniashvili A.N., Goginashvili N.G., Vashakidze A.A., Chkadua N.V. and Goniashvili E.S.

Georgian Technical University

The article considers the case when external force affects the system, and there can emerge forced oscillations, which are generally determined by the amplitude and the form of the force, and the parameters of the system. The frequency characteristics allow taking into consideration these factors, and studying more comprehensively the quality of tracking systems and their peculiarities. The characteristics of nonlinear elements depend on the amplitude of the initial impact. Assuming that the parameters for a definite value of the input amplitude are constant, nonlinear characteristics of elements and systems approximate to linear ones with variable parameters. For harmonically linearized equations describing the behavior of a nonlinear system, with the harmonic input system the amplitude of which permanently varies, we can obtain analytical relations for frequency characteristics.

Keywords: tracking system, forced movement, external force, frequency characteristics, nonlinear elements.

SUMMARY

ON THE MATERIALS TO BE USED FOR QUANTUM COMPUTERS

Namchevadze Ts.V.

Akaki Tsereteli State University, Kutaisi

In the article, it is noted that scientists have begun working on the technologies, methods and materials for quantum computers. The researchers discovered a material – lead iridate, the application of which will allow retaining the quantum state of individual atoms. Thus, the problem of long-term data storage will be resolved. A group of physicists from the National Institute of Standards and Technology, the USA, froze a mechanical object to the coldest temperature ever using novel equipment. The temperature was lower than the supposed quantum limit. The novel equipment employs compression of light. The object frozen at the temperature lower than the quantum limit can be used in quantum computers, which combine mechanical and quantum elements.

Keywords: quantum computer, cubite, lead iridate, quantum limit, compressed light.

SUMMARY

ON THE PERFORMANCE OF THE COMPUTER WITH CONTINUOUS HARDWARE CONTROL

Namchevadze Ts.V.

Akaki Tsereteli State University, Kutaisi

Continuous hardware control is one of powerful tools providing reliable performance of the computer. The control equipment has its own reliability. Hence, to select a rational control system, it is essential to define quantitative indices of the reliability of the computer with taking into consideration the reliability and validity of control of the given type. The readiness coefficient for three types of control is presented.

Keywords: readiness coefficient, continuous hardware control, reliability, failure, delay.

SUMMARY

PREDICTION OF THE CONSUMPTION OF THE INFORMATION AND COMMUNICATION TECHNOLOGY IN GEORGIA AND IN THE WORLD

Tsikhistavi T.T. and Svanidze R.G.

Georgian Technical University

The prediction of the consumption of the information and communication technology for the year 2020 and after is presented. Based on the IDI statistics for 2012-2016, the dynamics of IDI development in Georgia, the methodology and relevant formulae for Central and Eastern Europe are given. The predictions are made for the countries of these areas and the New Independent States. The prediction of IDI development in Georgia in connection with the IDI development in the abovementioned countries is also given.

Keywords: information and communication technology, GP diagram, prediction, ICT development index.

SUMMARY

DDS SYNTHESIZER-BASED RESONANCE FUEL GAUGE

Azmaiparashvili Z.A. and Epitashvili I.Z.

Georgian Technical University

The article deals with the issues of determination of fuel supplies, in particular with resonance methods of measurement of the level (mass) of oil or oil products in the reservoir. A structural scheme of the microprocessor-controlled resonance fuel gauge based on the DDS synthesizer. The gauge can be used both on vehicles and at filling stations. The basic characteristics of the DDS synthesizer based on the direct conversion principle are given, and the principle of digital control of the device is described. The operation algorithm of the synthesizer is described. The characteristics of the tank as a cavity resonator are given.

Keywords: oscillating system, resonant frequency, DDS synthesizer.

FABRICATION OF THE NANOSTRUCTURED InP LAYER ON THE GaP SURFACE

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Abstract: The physical nature of III-V semiconductor nanomaterials, the properties of quantum dots (QDs), and their usage are briefly reviewed. Original technology of fabrication of the III-V nanocrystal layer different from the Stranski-Krastanov growth mode, droplet epitaxy and chemical synthesis of colloidal QDs was developed. A phenomenological model of the formation mechanism of the nanostructured InP layer on the GaP surface is proposed.

Keywords: III-V semiconductors, quantum dots, fabrication technology, photoabsorption.

SUMMARY

THE PROBLEMS OF SMALL BUSINESS IN GEORGIA

Kurakhchishvili L.E.

Georgian Technical University

The article considers the problems of small business in Georgia. The development of small business is of vital importance for sharp improvement of the economic and social background of the country. The progress of small business is hampered by the lack of proper laws, and by insufficient support both from the state and financial sectors. The state must take decisive steps for the development of small and medium business. First of all, it is necessary to approximate the taxing classification to the statistic methodology. Rapid growth of the sector should be provided by elaboration of special supporting programs.

Keywords: small business, economic reform, statistics.

SUMMARY

REFINEMENT OF THE DESIGN SCHEME OF THE STRESS-STRAIN STATE OF CAST-IN-PLACE SLABS WITH ORTHOGONAL RIBS AND DOUBLE-SIDED VOIDS

Zambakhidze L.I. and Ninidze T.D.

Georgian Technical University

The article discusses the issues of refining the design scheme of cast-in-place slabs with orthogonal ribs and double-sided voids. 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.

SUMMARY

A MODEL OF THE STRATIFIED STRUCTURE OF A MOUNTAIN MASSIF WITH BOUNDARY CONDITIONS

Prikhod'ko S.Y., Konopatsky E.V. and Kakhiani M.P.

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Georgian Engineering Academy

A rock massif is a stratified structure, and, to construct its 3D physical -mathematical model of such a massif, it is necessary first to construct the models of separate layers of the massif based on the stratigraphic column. With consideration of all the constructed models and the boundary conditions, we obtain the general 3D model of the given mountain massif.

Keywords: mountain massif, stratification, 3D model, boundary conditions.

SUMMARY

A METHOD OF STRENGTHENING OF THE SURROUNDING ROCK MASSIF

Tsutskiridze I.N.

Georgian Technical University

The article deals with a method of strengthening of the surrounding rock massif. The method involves the cementation of the rock massif surrounding the tunnel, which improves the conditions of its work and its sustainability.

Keywords: rock massif, strengthening, cementation, sustainability.

SUMMARY

DEVELOPMENT OF THE GEOLOGICAL-ECONOMIC ZONING SCHEME BY THE EXAMPLE OF KVEMO KARTLI

Abzianidze M.D.

Georgian Technical University

The article considers the geological-economic zoning of Kvemo Kartli according to relative scores. Based on the list of mineral deposits of industrial significance located on the territory of Kvemo Kartli and using the abovementioned method, the territorial relationship between ideal and real values of natural resources was computed. The zoning map of Kvemo Kartli made up based on the calculation of relative scores is given.

Keywords: geological-economic zoning, relative scores, mineral raw materials.

SUMMARY

THE MINERAL-RAW MATERIAL COMPLEX OF KVEMOKARTLI AND METHODOLOGICAL RECOMMENDATIONS ON ITS RATIONAL USE

Abzianidze M.D.

Georgian Technical University

Mineral resources are one of important factors of the country's economy. Their rational development and utilization not only produce an economical effect, but also gives a positive eco-state of the environment. In the article, the mineral deposits of industrial significance located in KvemoKartli are described. There are identified four zones characterized by different natural, social, ecological and economic indicators. They differ in the concentration of mineral raw materials, and in the types and distribution of mineral resources. For these zones, methodical recommendations on the rational development and utilization of mineral resources with concurrent reduction of losses of competitive branches of industry and environmental pollution are given.

Keywords: mineral raw materials, mineral-raw material complex, rational nature management, geological-economic zoning.

SUMMARY

COMPUTATION OF THE WATER LEVEL VARIATION WITH WAVE PROPAGATION DURING A STORM IN THE BLACK SEA COASTAL LINE OF THE CITY OF POTI

Saginadze I.S. and Gamezardashvili Z.I.

Akaki Tsereteli State University, Kutaisi

The article discusses the variations in the mean water level and in the radiation stress during the propagation of waves in the coastal zone of the Poti region of the Black Sea. Based on the analysis of available literature, relevant formulas were derived for determining the variations in the water level from the wave breaking point in the direction of the sea and in the direction of the shore. For the Poti coast during the storms, the variations in the mean water level were calculated. In particular, when the wave height is $h = 4\text{m}$ and the period $T = 7\text{ s}$, then, from the wave breaking point, the level of lowering of water in the direction of the sea is $\eta = -0,14\text{m}$, and the level of rise in the direction of the coast is $\eta_b = 0.81\text{m}$.

Keywords: sea level, storm, wave breaking point, coastal line.

SUMMARY

WELDING OF METAL STRUCTURES FROM FERROMAGNETIC MATERIALS

Metreveli-Mandaria A.B.

Georgian Technical University

The article deals with welding of metal structures from ferromagnetic materials. In this case, both the dimensions of the welding contour and the sizes of the structure placed in this contour affect the welding contour reactance. Each welding machine should be connected to a separate electrical substation.

Keywords: welding, metal construction, welding contour, reactance, ferromagnetic materials.

SUMMARY

IRON OXIDE LEACHING FROM INDUSTRIAL WASTE OF THE PROCESS OF CYANIDATION OF AUTOCLAVE SLUDGE BY A SULFURIC ACID METHOD

Geleishvili I.T.

Georgian Technical University

The optimal parameters of the process of iron oxide leaching grade from industrial waste, such as the concentration of sulfuric acid, solid-and-liquid-phase ratio, and temperature and duration of the process were established. As a result, a high grade of iron oxide leaching (96.0%) from the waste of the process of cyanidation of autoclave sludge with production of iron (III) sulfate solution was achieved.

Keywords: leaching, iron oxide, industrial waste, cyanidation, autoclave sludge, sulfuric acid.

SUMMARY

THE TWO-PARAMETER LINEAR REGRESSION MODEL FOR A UNIMOLECULAR CHEMICAL REACTION

Dochviri B.M., Tkemaladze G.Sh. and Makhashvili K.A.

Iv. Javakhishvili Tbilisi State University

Georgian Technical University

For one class of unimolecular chemical reactions, a two-parameter linear regression model was constructed.

Keywords: chemical reaction, regression, linear model.

SUMMARY

THE ESTIMATE OF THE FINITE LIFETIME OF THE UNIMOLECULAR CHEMICAL REACTION

Dochviri B.M., Tkemaladze G.Sh. and Makhashvili K.A.

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Georgia Technical University

Using the autoregression model, the estimate of the finite lifetime of the unimolecular chemical reaction was constructed.

Keywords: chemical reaction, regression, linear model.

SUMMARY

THE AB₄-TYPE MOLECULES AND GANB-MATRICES

Gverdtsiteli M.I., Sidamonidze N.N., Chachua E.I. and Koiava N.A.

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Tbilisi State Medical University

Hydrides of group IV subgroup A elements (XH₄) were investigated in the scope of the GANB-matrices method. Two correlation equations were derived. The correlations are satisfactory.

Keywords: hydrides, group IV elements, GANB-matrix, correlation equations.

SUMMARY

INVESTIGATION OF THE AB₃-TYPE MOLECULES IN THE SCOPE OF THE GANB-MATRICES METHOD

Karchkhadze M.G., Ovsyanikova N.N. and Gverdtsiteli M.I.

Iv. Javakhishvili Tbilisi State University

The AB₃-type molecules –aluminum halides were studied in the scope of GANB-matrices method. Two correlation equations were derived and investigated. The correlations are satisfactory.

Keywords: aluminum halides, GANB-matrix, correlation equations.

ATHEMATICAL-CHEMICAL INVESTIGATION OF SILICON TETRAHALIDES WITHIN THE SCOPE OF THE GANB-MATRICES METHOD

Gverdtsiteli M.I., Karchkhadze M.G. and Gverdtsiteli I.M.

Iv. Javakhishvili Tbilisi State University

Mathematical-chemical investigation of silicon tetrahalides was carried out within the scope of the GANB-matrices method. Two correlation equations were derived. Correlations are satisfactory.

Keywords: silicon tetrahalides, GANB-matrix, correlation equation.

SUMMARY

MATHEMATICAL-CHEMICAL MODEL OF AB_n-TYPE MOLECULES AND THE GANB-MATRIX

Gverdtiteli M.I., Ovsyanikova N.N., Lobzhanidze T.E. and Giorgadze K.P.

Iv. Javakhishvili Tbilisi State University

A mathematical-chemical model of AB_n-type molecules was constructed and the corresponding GANB-matrix was considered. Boron halides were investigated within the scope of the GANB-matrices method. Two correlation equations were derived. The correlations are satisfactory.

Keywords: GANB-matrix, boron halides, correlation equations.

SUMMARY

THE ANTIOXIDANT EFFECT OF BIOLOGICALLY ACTIVE SUBSTANCES

ADDED TO VEGETABLE OIL

Virsaladze K.T. and Shengelia E.G.

G. Naradze Sanitation, Hygiene and Medical Ecology Research Institute, Georgian Technical University

In vegetable oil of the same kind produced by different manufacturers, oxidation processes proceed with sharply different intensity. Different antioxidant additives inhibit the oxidation processes in vegetable oil of different kinds in different ways and just during a certain period of time. In studied oils, vitamin C showed the best antioxidant properties.

Keywords: antioxidants, vegetable oil, polyunsaturated fatty acids.

SUMMARY

DIFFICULTIES OF DETERMINATION OF NITRATES IN SOME VEGETABLES

BECAUSE OF SPECIFIC PROCESSES

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G. Naradze Sanitation, Hygiene and Medical Ecology Research Institute, Georgian Technical University

The investigation carried out showed that the concentration of nitrates in some homogenized vegetable samples depends on how much time passed after the preparation of the sample until the content of nitrates was determined using an ion meter or a colorimeter. The concentration of nitrates especially increased in the delayed samples of chlorophyll-containing green vegetables.

Keywords: nitrates, green vegetables, ionometric analysis, colorimetry.

SUMMARY

INVESTIGATION OF THE SEDIMENTS OF WINE MATERIALS BY THE METHOD OF PYROLYSIS GAS CHROMATOGRAPHY

Shatirishvili Sh.I., Kiladze M.T. and Shatirishvili I.Sh.

Georgian Technical University

To acquire the information about biopolymers, the sediments of two types of Georgian wines “Kakheti” and “Rkatsiteli” were investigated by the method of pyrolysis gas chromatography.

Keywords: wine materials, sediment, biopolymers, pyrolysis gas chromatography.

SUMMARY

THE IMPACT OF SOME SPECIFIC FEATURES OF QVEVRI ON THE PROCESS OF MAKING WINE

Shiukashvili E.L. and Shakarashvili Z.D.

Jacob Gogebashvili State University, Telavi

The impact of the volume and shape of qvevri on the fermentation of must and wine maturation was studied. The results of the experiment showed that, to obtain wine of high quality, the fermentation of pulp together with grape stalks in the medium-volume qvevri (not more than 1500 l) is desired, while the completion of making wine from the wine material should take place in the qvevri of wide volume.

Keywords: Kakhetian wine, qvevri, alcoholic fermentation, flavor, wine material.

SUMMARY

THE POSSIBILITY OF INCREASING THE FOOD VALUE OF SUGAR CONFECTIONERY BY USING PUMPKIN SEEDS

Khetsuriani G.S.

Akaki Tsereteli State University, Kutaisi

The article considers the possibility of using a local vegetable raw material, in particular the seeds of Khokera pumpkin variety, for increasing the food value of pralines. The pralines recipe using the pumpkin seeds was developed. The

organoleptic and physicochemical properties of new products were studied. Based on the analysis of obtained results, the optimal amount of pumpkin seeds to be added to pralines was determined.

Keywords: pralines, pumpkin seeds, functional product, nontraditional raw material, physicochemical properties.

SUMMARY

ASPECTS OF THE RATIONAL NUTRITION OF ELDERLY PEOPLE

Pkhakadze M.D., Tavdidishvili D.R., Rusadze Kh.Z. and Burjaliani N.B.

The article deals with the rational nutrition of elderly people. The recipes and technology of flour confectionery products for social purposes were developed. The organoleptic and microbiological characteristic, and the chemical composition of the products were determined. The produced products had a positive effect on the organisms of experimental animal are of a high nutritional value.

Keywords: flour confectionery products, rational nutrition, elderly people.

SUMMARY

INVESTIGATION OF THE INTENSIFIERS OF TWISTING OF PNEUMOMECHANICAL YARN

Gogoladze M.Sh. and Abesadze N.M.

Akaki Tsereteli State University, Kutaisi

To determine the optimal shape of the surface of the end part of the intensifier, there were carried out experiments in the production of cotton yarn of linear density of 28 tex on pneumomechanical spinning machine BD-200RS. The optimal (ellipsoidal) shape of the end face of the intensifier rod was established and, based on the analysis of the generalized desirability function, the optimal radius of curvature between adjacent lateral surfaces of the rod was determined.

Keywords: pneumomechanical yarn, intensifier, twisting, ellipsoidal shape, spinning machine.

SUMMARY

MICROFIBER - TEXTILE OF THE XXI CENTURY

Moseshvili T.V. and Gamkrelidze E.A.

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The studies and introduction of innovative technologies for producing fibers and creating fabrics have proven that some synthetic materials often surpass natural silk, wool and cotton. The microfiber fabric, which is literally unrivaled in the most diverse spheres of human activities, relates to a new type of textile fiber. The modern microfiber material is composed of polyamide and polyester threads. Under the effect of a special composition, the polyamide fiber is dissected in the longitudinal direction so that its cross-section takes the configuration of an octagonal star. Then the polyamide thread is covered with polyester, which pushes off from it, and then is passed through the spinnerets. In the result, we get ultrafine fiber with a lot of micro-pores, due to which the properties of the microfiber are unrivaled. The microfiber is used to manufacture mats, knitwear products and weaving for clothes, upholstery, industrial filters and cleaning products.

Keywords: microfiber, textile, innovative technology, unique properties.

DESIGNING AND PLANNING OF CLOTHING WITH CONSIDERATION OF PHYSICAL PROPERTIES OF USED FABRICS

Dolidze N.A., Darsavelidze Kh.I. and Chirgadze K.A.

Akaki Tsereteli State University, Kutaisi

Abstract. The effect of shrinkage of the fabric on the original design of clothing is studied. The experiment showed that shrinkage of the fabric is a complex process and has a great impact on the quality and appearance garments. Therefore, it is essential to make allowances for shrinkage of the fabric when designing clothing. Eventually, the experiment was conducted to increase the external contour patterns by the example of the women blouse made of wool, silk and cotton fabrics. These allowances will provide sustainable constructions of clothes after multiple washing and the garments will fit the figure shape well.

Keywords: clothing, design, shrinkage of fabrics, allowance.

SUMMARY

IDENTIFICATION OF THE GENDER OF THE AUTHOR OF A GEORGIAN HAND-WRITTEN TEXT

Pilia R.M., Gorgodze M.Z., Goqadze M.B. and Shalamberidze M.Sh.

Akaki Tserteli State University, Kutaisi

Based on the analysis of Georgian handwritten texts executed by 100 men and 100 women, the models of studying the Georgian letters and the gender identification criteria were developed. It was revealed that the

relationship between the criterion and its identification frequency is represented in the form of ascending and descending exponents. The ascending exponent is characteristic of the woman's handwriting, and the descending exponent characterizes the man's handwriting.

Keywords: handwritten text, identification of the author's gender, ascending exponent, descending exponent.

SUMMARY

A SIMPLIFIED MODEL OF IDENTIFICATION OF THE GENDER OF THE AUTHOR OF A GEORGIAN HAND-WRITTEN TEXT

Pilia R.M., Zivzivadze L.B., Goqadze M.B. and Shalamberidze M.Sh.

Akaki Tsereteli State University, Kutaisi

Georgian handwritten texts executed by women and men were examined for particular signs corresponding to all letter examination models, the frequency of their detection and gender identification coefficients were analyzed. Based on this analysis, histograms and exponents were constructed. The exponent was also constructed for 12 letters containing round and close-to-round elements. Histograms and exponents for both woman's and man's handwriting are practically the same. Hence, for identification of the gender of the author of the text, it is sufficient to examine only 12 letters containing round and close-to-round elements.

Keywords: identification of the author's gender, woman's handwriting, man's handwriting, letters with round elements, histogram, exponent.

თენგიზ ბანძელაძის ხსოვნა



საქართველოს საინჟინრო აკადემიის წევრი თ. ბანძელაძე დაიბადა 1939 წელს ქ. თბილისში. პირველი საშუალო სკოლის წარჩინებით დამთავრების შემდეგ სწავლა განაგრძო საქართველოს პოლიტექნიკური უნივერსიტეტის ავტომატიკისა და გამოთვლითი ტექნიკის ფაკულტეტზე, საანგარიშო-ამომსხსნელი მოწყობილობის სპეციალობით, რომელიც დაამთავრა 1964 წელს და მიენიჭა ინჟინერ-ელექტრიკოსის კვალიფიკაცია.

1959-1961 წწ. მუშაობდა თბილისის ხელსაწყოთმშენებლობისა და ავტომატიზაციის საშუალებათა თბილისის სამეცნიერო-კვლევით

ინსტიტუტში.

1965 წლიდან მუშაობდა ქ. ულიანოვსკის მართვის გამოთვლითი მანქანების ქარხანაში, სადაც განვლო გზა ინჟინრად, უფროს ინჟინრად. 1967 წელს გადმოყვანილი იქნა თბილისში ხელსაწყოთმშენებლობისა და ავტომატიზაციის საშუალებათა თბილისის სამეცნიერო-კვლევით ინსტიტუტში მუშაობდა ლაბორატორიის გამგედ, განყოფილების გამგედ. სსრ კავშირის ხელსაწყოთმშენებლობის სამინისტროს მიერ როგორც გამოცდილი სპეციალისტი 1968 წლიდან მივლინებული იქნა ქ. ახვაზის (ირანი) ატომური ელექტროსადგურის მშენებლობაზე. ირანში ხანგრძლივი მივლინების დროს ბატონმა თენგიზმა თავი გამოიჩინა, როგორც ორგანიზატორმა, უშუალოდ მონაწილეობდა ატომური სადგურის ტექნოლოგიური პროცესის მართვის სისტემების გამოთვლითი მანქანების გაწყობა-გამართვის სამუშაოებში.

თ. ბანძელაძე იყო მრავალი გამოგონებისა და რაციონალური წინადადებების ავტორი. იგი გამოირჩეოდა პროფესიონალიზმითა და დაკისრებულ მოვალეობებისადმი დიდი პასუხისმგებლობით. ნაყოფიერი შრომისათვის დაჯილდოვებული იყო მედლებითა და სიგელებით.

თ. ბანძელაძე გარდაიცვალა 2018 წლის 1 იანვარს.

*საქართველოს საინჟინრო აკადემია
ჟურნალის რედაქცია*