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S U M M A R I E S

FORECASTED ANALYSIS OF ENERGY INDEPENDENCE IN GEORGIA.
D.Japaridze, I.Bichiashvili, N.Giorgishvili. **"Energy". №4(80). 2016. Tbilisi. p.6-21. geo. sum geo. engl. rus.**

The actuality of the modern solution of the problems raised in the article is given substance based on the analysis of the international experience of the optimal planning of energy resources production and consumption. Correlation analysis has revealed factors influencing production and consumption levels of energy resources in Georgia. Using auto regression model mid-term forecasting of the factors has been done. By means of regression and artificial neural networks mid-term forecasting of electricity, fuel, coil, natural gas and firewood production/consumption in Georgia has been estimated. Using trend-adjusted exponential smoothing method production and consumption parameters have been verified. Based on obtained data a medium-term forecasting methodology for local energy resources production as well as their consumption has been developed, relevant mathematical model has been set off and, accordingly, medium-term forecast parameters for local energy resources has been defined. Ill. 2, graf. 1, tabl. 23, bibl. 25.

PROCESS MODELING MATHEMATICAL THEORY OF ANALYTIC AND NUMERICAL METHODS IN SEMI-TRANSFORMER SINGLE CONVERTER SYSTEMS OF TRACTION SUBSTATIONS.
G.Kokhreidze, G.Prangishvili, G.Mtvarelishvili, E.Tetunashvili. **"Energy". №4(80). 2016. Tbilisi. p.22-27. geo. sum geo. engl. rus.**

It's considered to draft the differential equations of variable parameters to ensure process modeling through commutative (switching) functions of currents and voltages. The matrix of direct and reverse complex conversion of variables is developed through this example. The matrix of variable derivatives is determined, which appears to be the basis for computer modeling of the processes. The unified quantities of variables transition process modeling structural schemes and electric-magnetic and electric-mechanical transitive processes are adopted through quantitative methods. Bibl 2.

THE SOLUTION OF MATRIX EQUATIONS FOR THE VARIABLES CONDITION IN DEBUGGER-INVERTER AGGREGATES IN TERMS OF RECUPERATIVE BRAKING.
G.Kokhreidze, G.Prangishvili, N.Kekelia, G.Mtvarelishvili, E.Tetunashvili. **"Energy". №4(80). 2016. Tbilisi. p.28-33. rus. sum geo. engl. rus.**

The generalized matrix equations for the variables condition related to variable electrical quantities are defined. The quantities are represented by the variable coefficients. The solution of the equations is carried out for the non-switching intervals generalized in matrix form. The recurrent matrix equations are defined, which are compatible to the task solution by the computer technology. Bibl. 2.

THE RELATIONSHIP BETWEEN THE SLANTS OF TRANSIT AREA AND SEDIMENT MOBILAZATION FOR THE GUTTERS OF ARMENIA
G. R. Babayan, G. I. Karapetyan, G. G. Madatyan, G. S. Hovhannisyan. **"Energy". №4(80). 2016. Tbilisi. p. 34-39. geo. sum geo. engl. rus.**

The riverbed process in running waters has a major impact on different riverbed facilities. Therefore the proper evaluation of the boundary locations for the transit of sediments and their deposits has not only scientific but also significant practical importance. The carried out research makes it possible to identify the correlative dependence between the slants of transit areas and sediment mobilization for the major rivers of Armenia. The findings can be utilized in the design and construction of riverbed facilities in the identified rivers. Ill. 4, bibl. 5.

CLEANING BASIN WATERCOURSES RIVER AGSTEV FROM POLLUTION AND PROTECTION OF LEVEE LANDSCAPING Siti DILIJAN. ***Baljyan P.O., Tokmajyan V.H., Baljyan A.P., Kamalyan D.J.*** **"Energy". №4(80). 2016. Tbilisi. p. 40-48. rus. sum geo. engl. rus.**

Along with the expansion of the international school complex in Dilijan, it is planned to equip the urban environment, including the embankment of the river Aghstev. In the framework of that program, one of the primary tasks is to clean Aghstev, its tributaries Bldan and Ovadzhur. The planned engineering activities, in addition to the clearing functions, must ensure the protection of the riverbank infrastructures from mudflows, not polluting the environment and without impeding the free movement of the river animals. On the basis of engineering studies, calculations and structural developments, a concept and options to clean up the streams and protect the embankment from mudflows are proposed. The developed concept is accepted as a basis and after the feasibility substartiation,the final options for the design and construction of facilities on the rivers Aghstev, Bldan and Ovadzhur will be selected. Ill.7, tabl. 3, bibl.8.

ELECTROMAGNET *PROCESSES TRANSITING IN THE REGULATED HYDRO-GENERATOR.*
***T. Kokhreidze, L. Mebonia.* "Energy". №4(80). 2016. Tbilisi. p. 49-54. geo. sum geo. engl. rus.**

One discusses electromagnet processes transiting in the regulated hydro-generator. There is a system of equation, by means of which one can analyze quality of transition processes of the synchronic machine, as well synthesis of creating rational structure of excitation automate regulating system. Ill.3, bibl. 1.

HYDROGENERATOR WORKING DURING ASYMMETRICAL PRESSURE.
***T. Kokhreidze, L. Mebonia.* "Energy". №4(80). 2016. Tbilisi. p.55-58. geo. sum geo. engl. rus.**

One has learnt the event, which is ongoing in the circuits of hydro-generator rotor and stator, during simultaneous working with the system in case of asymmetrical pressure. It is shown that in the mentioned case asymmetrical system of electricity is created through the scroll of the stator phases with special ω angle frequency, which may be disintegrated by three symmetric system with the same angle frequency: with zero, direct and backward direction. One has done the analysis for the mechanism of creating higher order harmonics, which is represented in a form of schedule, made with the main ω_o frequency for the forced component allowing that the rotor is rolling with S sliding. Tabl. 1, bibl. 1.

PROCESSING OF CONSTANT CURRENT NON-CONTACT ELECTRIC ENGINE FOR OIL PUMP DRIVE OF HEAT TURBIN AND HEAT GENERATOR IN THE THERMAL POWER STATIONS.
***T.Kokhreidze, G.Chachkhiani.* "Energy". №4(80). 2016. Tbilisi. p.59-63. geo. sum geo. engl. rus.**

The paper developed constant current non-contact electric engine for oil pump drive of Heat Turbin and Heat Generator. The new system of the Drive provides the following technical and economic effects: the increase in the average COP in the regulation of the rotation speed; The sharp decline in currents; As a result, the resource of electric motors is significantly increased and terms of service are expanded, the costs for strengthening supply net of own use are reduced, which is necessary in case of large currents.

Equations of transmission and established modes are obtained, which enable to carry out a comprehensive analysis of the current processes. Ill. 1, bibl. 1.

ESTABLISHED MODES OF HEAT TURBIN AND HEAT GENERATOR OIL PUMP CONSTANT CURRENT IN NON-CONTACT ELECTRIC DRIVE *T. Kokhreidze, G.Chachkhiani.* "Energy". №4(80). 2016. Tbilisi. p.64-69. geo. sum geo. engl. rus.

We studied the established modes of oil pump constant current in non-contact electric drive. Equations of established mode are obtained, taking into account the Law on Regulation. Equations are solved using computer technology and speed and mechanical characteristics of engine are obtained for various values of switching frequency of commutator. The results obtained are analyzed. Ill. 4, bib. 1.

USE OF STATIC SYNCHRONOUS COMPENSATOR IN THE AKHALCIKHE SUBSTATION.
***G.Arziani, M.Rukhvadze, G.Shovnadze.* "Energy". №4(80). 2016. Tbilisi. p.70-73. geo. sum geo. engl. rus.**

This article discusses the advantage of use of static compensator compared to synchronous one at the converter station. Computer modeling of transient processes was conducted to estimate the bus bur voltage curves during and after the emergency shutdown of the HV overhead line. Overvoltage levels are compared in two different cases. It is shown that in case of synchronous condenser it is possible to happen a selfexitation of a machine and the voltage to reach and impermissable level. Static compensator solves that problem. Ill. 3, tabl. 1, bibl. 3.

MODELING OF COMMUTATION OF A HIGH VOLTAGE OVERHEAD LINE.
***G.Arziani, I.Gordiashvili.* "Energy". №4(80). 2016. Tbilisi. p.74-76. geo. sum geo. engl. rus.**

This article discusses the modeling of commutation of a high voltage overhead line by ATPdraw software. The main components of the circuit are described. The three phase voltage waveforms for the beginning and the end of the line are shown. The modeling showed that the overvoltage at the receiving end of the line is greater than the sending one. This is caused by transient processes after the commutation of the line. Ill. 3.

THE RESULTS OF THE REACTIVE POWER COMPENSATION RESEARCH OF ELECTRIC CONSUMERS WITH ASYMMETRIC REACTIVE LOAD. ***B.Tchunashvili, A.Petrosyan, M.Tugushi, A.Gvimradze.*** **"Energy". №4(80). 2016. Tbilisi. p. 77-82. geo. sum geo. engl. rus.**

Due to power network investigation the nature of consumption of reactive power users, the rate of reactive power distribution and asymmetry in certain phases were revealed and assessed. At the same time the problems occurred as a result of asymmetric reactive power users compensation in power network and their feasibility were determined. Practice shows that the reactive power determination and compensation

methods used today are not acceptable. It is necessary to take into consideration asymmetry and determine compensation power for each phase individually during reactive power compensation. Ill.2, tabl. 1, bibl. 4.

DRAWING UP EQUATIONS IMPOSITION OF FICTITIOUS ORTHOTROPIC SYSTEMS UNDER WITH SOLUTIONS OF SUCH PROBLEMS WHEN IN THE BODY ARCH DAM ALONG TO THE OTHER UNKNOWN QUANTITIES, ARE MODULES DEFORMATION ITS OF FOUNDATION.
***A.Chelashvili, G.Megrelishvili, D.Gokhelashvili, G.Markarashvili*. "Energy". №4(80). 2016. Tbilisi. p.83-87. geo. sum geo. engl. rus.**

It examines the way of a positive decision problematic issues that arise in the operation of arch dam, using the method of imposition of fictitious orthotropic systems. When the base of the arch dam, in a high filtration effects, significantly increase the value of the displacement arch dam, comparing with designed the value the same the value of the dam. The purpose of research is (for the single-center symmetrically arch dam, located in such conditions, using real value of the components of the body displacement of the arch dam, getting with field observations of this dam), be solved scientific problem and install together with other unknown quantities and value of the modulus deformations of basis arch dam.

In the article is given (in the calculation the single-center symmetrically arch dam in the "first approximation") the way compiling the equations of merging of fictitious orthotropic systems for tasks such when in the body of arch dam, together with other values, the unknowns are and the magnitudes modules deformations basis of that arch dam. Ill. 1, bibl. 4.

POSITIVE RESULTS OF HYDROPOWER DEVELOPMENT IN GEORGIA.
***N.Samsonia, G.Chachibaia, A.Gagua.* "Energy". №4(80). 2016. Tbilisi. p.88-91. geo. sum geo. engl. rus.**

In the paper discussed possible positive results by building the Hydro power plant, in particular Namakhvani Hydro Power Plant cascades, such as expected socio-economic benefits of the region, from the construction and operation phases of the HPP, also improve the reliability of the country's energy security; Improve energy and economic indicators and approach the world's leading countries same indicators. Ill. 2, tabl. 1, bibl. 3.

INTEGRITY OF THE IMPACT OF THE ENVIRONMENTAL ISSUES DURING THE PIPELINE CONSTRUCTION AND OPERATION. *S.Berishvili, Y.Lomidze.* "Energy". №4(80). 2016. Tbilisi. p. 92-95. geo. sum geo. engl. rus.

Construction of the pipeline is the difficult and complicated task, construction of such structures require proper planning both on design and construction stages in order to avoid environmental damages. It is important to develop Environmental Impact Assessment on design stage. In addition to Environmental Assessments and Management Plans. Construction companies should act in accordance of these Environmental and Social Management Plans this will eliminate risks, thus the environmental security of the pipelines will be protected and this will assist in analyzing of the impact of the environmental issues during the pipeline construction and operation and will reduce risks of the accidents on pipelines. Bibl. 13.

TECHNOLOGICAL ISSUES OF PREPARATION, TRANSIT AND THICKENING OF ECONOMICAL AND HIGH SOLIDITY CONCRETE. *I.Mikashvili.* "Energy". №4(80). 2016. Tbilisi. p.96-102. geo. sum geo. engl. rus.

The scheme over production preparation, transit and tightening of concrete mixture. The scheme includes system, containing new type vibrating mixer, vibrating hoppers, vibrating troughs, vibrating distributor and horizontal deep vibrators. Elements of systems are linked by steel wire ropes, corresponding shock- absorbers, flexible and rigid pipes and are maneuvering by auto cranes. By proposed scheme, mixing of concrete components and transit of concrete mixture is based on the vibration-gravity flow of concrete mixture on the vibrating mixer and elements of system, inclined to the horizon by $5\text{-}20^0$. Vibration systems provide surface vibrators attached to each element of the system. Ill.5, bibl. 10.

METHODS FOR REINFORCEMENT OF WORKING ON ECCENTRIC COMPRESSION MASONRY WALLS. *Sh. Bakanidze, L.Zambakhidze, T.Moralishvili*. "Energy". №4(80). 2016. Tbilisi. p.103-106. geo. sum geo. engl. rus.

There are cases when the old un-reinforced masonry longitudinal walls of reconstructed buildings, at receiving thrust force from roof structures, are workingon eccentric compression. In such cases it is necessary to check of walls on above mentioned load and, if necessary, to carry out appropriate constructive measures.

To accomplish the purpose of increasing of above mentioned walls load bearing capacity, in the work is offered their reinforcement, as well as arrangement of special thrust receiving structures and combined measures. Ill. 5, bibl. 3.

STUDY OF THE FEATURES OF ADDITIVES CONTAINING CONSTRUCTION MATERIAL MADE WITH LOCAL CONSTRUCTION MATERIAL AND ITS INTRODUCTION INTO THE CONSTRUCTION INDUSTRY AS WELL AS IN THE ROAD INFRASTRUCTURE.

M. Lordkipanidze, O. Giorgobiani, I. Salukvadze, N. Bochorishvili, A. TatanaSvili, T. Ninidze.

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Economic Development of Georgia greatly depends on the effective use of its transit potential. The function of Georgia, as a country with the connecting transport corridor between Europe and Asia, has significantly grown, and this, first of all, means creation and development of a high quality transit road infrastructure. Utilization of a long-life and efficient, both regular and compacted concrete in the road construction is very topical in the construction industry.

The road infrastructure, except for the roads themselves, also includes various types of the structures and constructions that are served by these roads. Besides, we consider that the monuments of the cultural inheritance located in the immediate vicinity of such roads, are essential parts of the infrastructure. They have been performed with the local construction material using the construction as well as anti-seismic technologies of that times.

Concrete and reinforced concrete constructions are always under the load in the construction industry; as the time passes they experience the change in the physical and mechanical features in particular creep deformation.

Strength and sustainability of any structure and construction as well as the structures participating in the roads and their infrastructure directly relate to the mechanic properties of their base soil, first of all, to their deformation module.

Thus, the presented topic is based on the scientifically structured and, from topicality viewpoint, very important problem – creation of new, additive containing, concrete using the local construction material and its further introduction in the road infrastructural structuress and constructions.