ASSESSMENT OF MAGNETIC INDUCTION FOR LOSSES IN THE MAGNETIC TRANSFORMER AT VRIOUS SYSTEMS OF BLENDING MAGNETIC CIRCUT

K. I. Bagaev

The article presents the basic methods of production of magnetic core transformers. We studied the effects of magnetic induction on specific losses in the magnetic core for the two main systems. We analysis of the obtained data.

Keywords: magnetic circuit blending system, the loss of the transformer.

PILOT STUDIES OF MIKRO HYDRO POWER PLANT WITH THE AXIAL TURBINE AT THE HYDRAULIC STAND

I. A. Bakhtina, V. M. Ivanov, S. V. Il'inykh, P. V. Stepanova, E. S. Yelizarov

In paper resulted: worked out by authors axial hydro-turbine of new original construction and hydraulic stand for the complex design of flowing parts of hydro-turbines, control and measuring apparatus and methods of measuring of experimental sizes, results of pilot studies of micro hydro power plant.

Keywords: axial hydraulic turbines, design, methodology, calculation, hydraulic stand.

A NEW APPROACH TO THE DETERMINATION OF PROTECTION ZONES AIR POWER LINES

I. V. Belitsyn

The article discusses issues related to the protection zone overhead transmission lines of different voltage class. A new approach to the definition of the buffer zone, which shows how design features of transmission lines, as well as medical and biological requirements. Shows the distribution of the electric field at a height of 1.8 from the ground resulting in experiments.

Keywords: electric field strength, air line power transmission, security zone.

AREAS OF IMPROVING THE METHODOLOGY FOR ENERGY PROJECT ASSESSING COST-EFFECTIVENESS

E. S. Belchikova

The Russian Federation energy industries current state and the necessity of the new investment projects establishment in this sector are considered in the article. The basic approaches to the discount rate definition are described and possibilities of their use in the energy projects calculation are analyzed. Recommendations for improving the existing methodology for investment project assessing cost-effectiveness are presented.

Keywords: discount rate, weighted average cost of capital method, accounts payable, cumulative construction model, ownership capita.

WIDEBAND POWER HARMONIC FILTERS

N. P. Boyarskaya, V. P. Dovgun, E. S. Shevchenko, D. E. Egorov

A design procedure of wideband harmonic power filters, based on the use of methods of synthesis of passive LC-two-ports, is considered. Proposed approach allows to receive the power harmonic filters providing attenuation of current and voltage harmonics in the set range of frequencies, and also compensation of reactive power at a frequency of the basic harmonic.

Keywords: power quality, harmonics, wideband harmonic filters.

THE OPTIMAL WAY OF POWER DISTRIBUTION IN AN AUTONOMOUS POWER COMPLEX

A. V. Brylev

This article describes optimal electric power distribution according to priority levels, the function of the internet/GSM-technology in the system of optimal electric power distribution of autonomous power complex.

Keywords: optimal control, automatic control, autonomous power complex, optimal electric power distribution.

STUDY OF STRENGTH VARIOUS MODIFICATIONS FRICTION WEDGES FREIGHT CAR BOGIE

A. V. Gabets

The results of bench tests and laboratory-friction wedges onnyh freight car bogie. Comparative analysis was performed for serial and lightweight design of the friction wedge made of steel 20GL, Cast Iron and GI25 iron alloyed with molybdenum. The substantiation of the possibility of reduction of material friction wedge.

Keywords: lightweight friction wedge iron modified molybdenum, the structural strength of the wedge , the wedge material consumption.

SPECIAL FOR CAST IRON FRICTION WEDGES RAILWAY CAR TRUCK

A. V. Gabets

Developed special cast iron composition provides the required level of stability and structural characteristics of the molten metal. A number of patterns of influence of the total content of trace elements on some combination of the processes of structure formation of gray iron and the desired mechanical properties of castings.

Keywords: lightweight friction wedge iron modified molybdenum, the structural strength of the wedge, the wedge material consumption.

INDUCTION MOTOR'S ROTATING ELEMENTS DIAGNOSING BY THE WAVE DAMPED OSCILLATION METHOD

A. A. Gribanov

Experimental research data of wave damped oscillation in induction motor's windings spectral composition variation on its rotating elements technical state are described in the article. Diagnostic technique of induction-squirrel-cage motor rotating elements is examined.

Keywords: induction motor, diagnosing, wave damped oscillation, eccentricity, spectral analysis.

APPLICATIONS TRAINING SIMULATOR-DESIGNERS FOR PREPARATION BACHELORS OF 140400 «POWER AND ELECTRICAL ENGINEERING»

I. A. Gutov

Application of information and software to prepare students for the direction 140400 "Electric power and electrical engineering" on a subject "Electric power systems and networks" are considered in the article, the description of software products are presented.

Keywords: electric power system, electric network, principally electric scheme, substation, switchgear, software.

INDUSTRIAL MAINS ELECTRICITY QUALITY MONITORING

V. V. Dubinin, A. N. Popov

Developed industrial low voltage mains electricity quality monitoring appliance considered in the article. Classification and the analysis of existing methods and appliances for electric power quality measurement are given. Structe and circuit diagram of the developed device provided.

Keywords: electricity quality, monitoring, diagnostic appliances.

RESEARCH AND CALCULATION OF THE MECHANICAL CHARACTERISTICS OF THE THREE-PHASE ASYNCHRONOUS SQUIRREL-CAGE ELECTRIC MOTOR, STARTING OR OPERATING FROM THE SINGLE PHASE NETWORK BY VECTOR-ALGORITHMIC COMMUTATION OF THE STATOR WINDINGS

S. Y. Eremochkin

In the article the question of drawing of the mechanical characteristic of the three-phase asynchronous electric drive with the vector-algorithmic control is considered. Vector diagram of a circular rotating field of the stator of the electric motor and the mechanical characteristics of the three-phase asynchronous electric motor, starting and operating from the single-phase network by means of the single-phase three-phase transistor reversing commutator.

Keywords: three-phase asynchronous electric motor, vector-algorithmic control, electric drive.

ANALYSIS OF APPROACHES TO DEVELOPING AUTOMATED SYSTEMS OF OIL AND GAS COMPANIES

A. M. Ziatdinov

In this article the issue of increasing the effectiveness of technological processes regulation is examined of the of oil and gas industry and is automatic control the system of oil and gas transportation and treatment is considered with various types of logic controllers.

Keywords: transportation and treatment, oil and gas company, automation, logic controller.

ENERGY SAVING WITH MIKRO-GES ON KOLYVAN STONE-CARVING FACTORY

V. M. Ivanov, T. Y. Ivanova, P. P. Svit, B. V. Syomkin

In 2013 the Kolyvan Stone-Carving Factory will celebrate its 210 anniversary. In 2000 the Administration of the Altai Region has taken the decision to reconstruct this historical monument, including the water wheel and the hydro-engineering works.

The work on reconstruction is carried out according to the project developed by scientists of the Altai State Technical University named after Ivan I. Polzunov. The head of the project is the State Unitary Enterprize «Altaiavtodor».

Keywords: energy saving, micro hydroelectric power station, water filling wheel, system of automatic control.

WAVE PROCESS IN POWER TRANSFORMER WINDING UNDER THEIR TEST VOLTAGE SQUARE WAVE MATHEMATICAL MODELING

D. V. Kokorin, N. A. Lebedev

The development of mathematical models describing the processes existing in power transformer's winding during testing them with the help of voltage impulses is shown in the article. Classification and analysis estimation technical state power transformer's winding being methods are substantiated. It was shown the developed mathematical model of transient process in power transformer's winding during their testing with the help of voltage square wave with schemes of connecting windings «triangle» and «star».

Keywords: mathematical model, diagnosing, transient process, power transformer, prognosis, low-voltage impulse method.

CONDUCTOMETRY IN CHARACTERIZATION OF THERMAL KINETICS IN POWER EFFICIENT TECHNOLOGIES

V. M. Korotkikh, T. M. Khalina, M. V. Dorozhkin

It is assumed, that the conductivity of the system in the coplanar-electrode area grows proportionally to a change in the position of the combustion front of the self-propagating high-temperature synthesis. According to a change in electrical conductivity, the spatio-temporal functional relations of the thermal kinetics of the process are determined. The research results confirm the effectiveness of this method in the development of controlled electro-technology of restoration and repair of worn-out agricultural machinery.

Keywords: repair, agricultural machinery, conductometry, electric conduction, thermal diffusivity, rate of the combustion front, self-propagating high-temperature synthesis.

RANGE OF PROBLEMS ASSESSMENT EFFICIENCY CIRCUITRY OF HEATING OF ITS DEVELOPMENT AND SELECTION OPTIMAL VARIANT

K. S. Kostuk, S. S. Chernov

In the article are considered all possible participants of heat supply system and described main problems in making attempt to unit all them demands and possibility of participations at the system. Impact of this problems on calculation of economic efficiency indicators of developing circuitry of cities' heating to perspective. Subsist approaches in solving problems under review and disadvantages of this approaches are described. Necessity and area of improvement subsist of legislative acts about development circuitry of cities' heating are described.

Key words: heating, heat supply system, circuitry of cities' heating, economic efficiency, payback period, guidelines.

SEED CHARACTERISTIC FLUCTUATION EXPOSE TO THE ELLIPTIC ELECTROMAGNETIC FIELD

E. A. Kotygin

The article shows the problems dealing with experimental confirmation of the magnetic field influence to the speed of water absorption in the dependence on time exposure, polarization strength and the magnetic field intensity absolute value. A review of a plan and method is made on the practical experiment and the result analysis. Maximal water absorption Influencing factor numerical values is presented.

Keywords: magnetic field, polarization strength, magnetic field intensity, water absorption speed, electro engineering, presowing seed treatment.

COMPARATIVE ANALYSIS OF ENERGY EFFICIENCY OF DRIVE CONTROL SYSTEMS OF ASYNCHRONOUS MOTOR WITH PHASE ROTOR

M. I. Kotsur, P. D. Andrienko, I. M. Kotsur

A modified pulse control system of asynchronous motor with phase rotor is introduced. A comparative analysis of the values of the current coefficients of harmonic distortion of the stator and rotor asynchronous motor and energy efficiency of the modified pulse control system with classic pulse control system and asynchronous gate cascade are executed.

Key words: regulation, asynchronous motor, harmonics, energy efficiency, pulse.

DETERMINATION OF ENERGY RESERVES AUTONOMOUS MULTIPLE UNITS FOR THE PROCESS OF ENERGY RECOVERY

D. A. Kulagin

The questions of power balance railcar rolling stock at various modes of doing the train. A general description of the model determining the energy reserves of the rolling stock for assessing the implementation of the process of energy recovery.

Keywords: recovery, energy data, the balance of power, the motor-car rolling stock, traction power transmission.

ANALYSIS OF PRODUCTION AND CONSUMPTION IN THE UNITED ENERGY SYSTEM OF UKRAINE

V. A. Malyarenko, I. E. Shcherbak

The production and consumption of electricity by different sectors of the national economy of Ukraine have bun analyzed. The possibilities of application of payment for population including during the day, time differentiated, have been considered. The recommendations for improving the use of energy resources in the housing and communal services have been given.

Keywords: fuel and energy resources, electricity, electrical appliances, graph of the electric capacity, users-regulators

THE TENDENCIES OF THE LOCAL POWER ENGINEERING MODERNIZATION ON A CO-GENERATIONAL BASE

V. A. Malyarenko, A. L. Shubenko, A. V. Senetskaya, I. A. Temnohud

The issues of the rational use of the combined production mechanization of heat and power engineering, namely the cogeneration, are being analyzed. It has been testified to the fact that the application of cogeneration gives an opportunity to use fuel and power resources. Thus, the specific horse power consumption of a fuel for the power production while the process of mechanization of the mini heat and power supply stations in steam boilers makes the amount of 180 g. s. f. c. (kVt per hour) to the average.

Keywords: local power engineering, cogeneration, turbine, power production scheme.

MODELS OF RELIABILITY AND TECHNICAL STATE OF ISOLATION OF ELECTRIC MOTORS USED TO PREDICT THEIR FAILURE

E. O. Martko

In the article the basic model of reliability and technical condition of the insulation of electric motors used to predict the release of their failure.

Keywords: model, engine, insulation, temperature.

SYNTHESIS OF THE RADIAL TOPOLOGY SHOP POWER SUPPLY CONTAINING POWER CONSUMERS WITH RECOVERY

V. P. Metelskiy, A. P. Zabolotniy, D. V. Fedosha, Y. V. Daus

There was proposed an approach and developed an algorithm for the structure constructing of the radial topology shop power supply, taking into account the existence in the system power consumers recovery and at the same time solving a crucial problem of determining the load units number and their installation coordinate, distribution between power consumers, determination the power supplies structural performance.

Keywords: algorithm, shop power supply, recovery, load units.

SIMULATION MODE OF SOURCE PROBING SIGNALS FOR CONTINUOUS MONITORING OF THE INSULATION OF ELECTRICAL GRIDS OF 6-10 KV

A. H. Musin, A. A. Zarubin

The problems of computer simulation modes of the source region-diruyuschih signals for the continuous monitoring of electrical isolation circuits 6-10 kV, with a view to identifying areas of stable operation of the resonant circuit, the definition of its carrying capacity, optimization of regime parameters and overall weight and dimensions. Modeling was carried out in a software environment MatLab.

Key words: a source of probing signals, control isolation, MatLab.

ISSUES STUDY RISK OF ELECTRICITY CONSUMERS

A. H. Musin, A. A. Zarubin

The problem questions the study process, risks of power supply from a common scientific and methodological rozitsy covering risks in nature, technosphere, society, economy. Describes the difficulties of risk management.

Keywords: risk, risk management.

FAULT-TOLERANT INDUCTION MOTOR DRIVE

G. I. Odnokopylov, A. D. Bragin

Principle of construction multi-phase induction motor drive is discussed. This drive allows fault-tolerant control based on programmable non-sinusoidal currents with the recovery operability through enhanced recovery algorithm in the control microcontroller by repeated failures of the frequency converter and the motor. The simulation results for emergency situation such as "phase loss" for the case of three-phase motor with full recovery operability induction motor is given.

Key words: fault-tolerant induction motor drive, multiphase induction motor drive, non-sinusoidal current.

INDUSTRIAL MAINS BOWNOUTS ELIMINATION

A. N. Popov

Developed industrial low voltage mains brownouts elimination appliance considered in the article. Classification and the analysis of existing brownouts elimination methods and appliances are given. Structure and circuit diagram of the developed device provided.

Key words: electricity quality, monitoring, electrical mains.

EXPERIMENTAL STUDY OF DEVICES SUN TRACKING PRODUCTIVITY ON SOLAR DESALINATION PLANT

I. R. Rahmatulin

The article deals with laboratory testing of solar desalination con-INSTALLATI with sun tracking device. The conclusions about the possibility of using sun tracking device for vacuum tube solar collector.

Keywords: sun tracking device, solar desalination plant, vacuum tube solar collector.

TCELEPOLAGANIE BASED IMAGING OF EXPERIMENTAL DATA DURING THE RAILWAYS OF INNOVATION

A. V. Semenov, A. V. Gabets

The problems of forming a working hypothesis innovative improve its operational friction wedge freight car bogie through the development of new material. For this purpose, a specific set of experimental data demonstrated the application of graphical methods of exploratory data analysis. namely methods of data visualization. The results of visual analysis of the proposed model of technical condition of the friction wedge in the parameter space allowed to justify the choice of target research.

Keywords: innovative car, the friction wedge, wedge technical condition, visualization of experimental data, the surface of the wedge trend setting performance, the purpose of research to improve the performance properties of the wedge.

ENERGY STORAGE IN LOCAL ELECTRIC NETWORKS

N. I. Smolentzev

The paper deals with the development of alternative energy based on clean, renewable energy sources, in particular the local electrical networks. The most important factors in the development and implementation of local electric networks is their intellectualization and the creation of energy storage on the physical effects. high-temperature superconductivity (HTSC).

Keywords: local electrical grid, energy efficiency, intellectual technology, high-temperature superconductivity (HTSC), energy storage.

MEASUREMENT MODEL DIAGNOSTIC INDICATORSSTATE INSULATION WINDING ASYNCHRONOUSMOTOR

G. V. Sukhankin

The article deals with the measurement model diagnostic indicator insulation of electrical machines, in particular induction motor. As a diagnostic indicator selected modulus of the insulating material.

Keywords: model, a diagnostic sign, a sound wave, the winding insulation.

IMPROVE THE EFFECTIVENESS OF ENERGY SAVING IN ELECTRIC NETWORKS

S. O. Khomutov, V. A. Rybakov, V. D. Gorshenina

This article provides general information on the mathematical model construction to carry out the energy saving measures planning in relation to a particular network company. Considered energy-saving measures in the power sector. Defined indicators system of mass service, and provides the results to develop methods to optimize these parameters.

Keywords: energy saving, electric networks, loss, queuing theory.

THE GENERAL PRINCIPLE OF ELECTROMAGNETIC SEPARATORS SERIES USS

V. I. Tcharykov, A. I. Yakovlev

In the article the principle of prosypnyh separators conventionally named USS (installation of dry separation), developed in Kurgan-State Agricultural Academy. This is a comparison of the theoretical and pilot of the calculation results of separators with different due-by a magnetic field.

Keywords: magnetic separator, magnetic hub in output, principle of operation, the metal particle.

USE OF LOCAL SOURCES IN SMART GRIDS WITH THE REQUIRED QUALITY OF ENERGY

L. M. Chetoshnikova

The future grid will include various local sources as an alternative to centralized power generation in supported local loads . The cost of electricity generated by local sources will depend on the type of source , availability of renewable energy, energy storage and use etc. In this paper, we propose a method to optimize the use of local sources through careful selection of them in order to minimize the total cost of electricity.

Keywords: local sources of energy, renewable energy, microgrid, distributed generation.

APPLICATION SELF-LIGHTING SYSTEMS BASED SOLAR MODULE FOR PARK AREA

L. M. Chetoshnikova, A. I. Guskova

This article presents a self-lighting system of the implementation of energy efficient lighting in the forest area.

Keywords: self-lighting system, solar cell, electrical equipment, renewable energy.

ELECTROTECHNICAL COMPLEX FOR THE SURFACE MODIFICATION OF GLASS BY THE FLOWS OF LOW TEMPERATURE PLASMA

A. A. Shram

The article describes the electrotechnical complex for the surface modification of glass by the flows of low temperature plasma at atmospheric pressure. The technological parameters of processing and the results of research of glass samples are given. As a result of X-ray spectrum microanalysis found that after ion-plasma treatment of the glass under atmospheric pressure, its surface become a layer structurally modified by the implanted impurity ions.

Key words: low-temperature plasma, glass, surface modification, electrotechnical complex, X-ray spectrum microanalysis.

NUMERICAL - FIELD ANALYSIS OF ELECTROMAGNETIC AND ELECTROTHERMAL PROCESSES IN BUS PACKAGES FURNACES OF GRAPHITIZATION

D. S. Yarymbash

The presented universal method of calculating of AC graphitization furnace bus package using three-dimensional numerical analysis of electromagnetic and electrothermal models are characterized computational efficiency and accuracy. The temperature dependence of the electrical and thermal properties of the bus and current feeders, the spatial location of the furnace loops components, features of its design are took into account. The implementation of the load equalization criteria of bus current density and electrical losses density for the identification of the front bus package design parameters are reduced their weight, power losses and improved electrode graphitization energy efficiency.

Keywords: graphitization furnace, furnace loop, front bus packages, numerically-field analysis, electromagnetic and electrothermal model conjugation, the load equalization criteria, the design parameters, energy efficiency.