



Vestnik of Ivanovo State Power Engineering University (Vestnik ISPEU)

The Journal has been published since 2001

ISSN 2072-2672

Issue 2 /2011

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The Journal «Vestnik of Ivanovo State Power Engineering University» is included in the List of Leading Reviewed Scientific Journals and Publications, which are approved by the State Commission for Academic Degrees and Titles for publishing the main scientific results of the dissertations on the candidate and doctoral degrees.

The information on published articles is included into the Russian Science Citation Index system according to the Agreement №29-05/08 dated May 20, 2008 with JSC ltd. «Scientific Electronic Library».

HEAT AND POWER ENGINEERING

UDK 621.321

TESTING OF TURBOUNIT TP-115/125-130-1TP PO TMZ WHEN OPERATING IN HEAT-EXTRACTION MODE WITH TWO-PHASE HEATING OF DELIVERY WATER

G.V. LEDUKHOVSKY, A.A. POSPELOV, Candidates of Engineering,
N.S. ASTASHOV, S.V. DOBROV, I.B. VOLKOV, G.B. KOMISSAR, Engineers

The authors present the methods, the test results and the diagram of operation modes of the Turbounit Tp-115/125-130-1TP PO TMZ at Yoshkar-Ola heat power plant 2 in operation mode with regulated heat steam extraction with two-phase heating of delivery water.

Key words: steam turbine, extraction turbo unit, steam extraction, tests of the equipment.

UDK 658.26

THERMODYNAMIC ANALYSIS OF CONDENSATE GATHERING AND REUSING SYSTEM

I.A. KONAKHINA, Doctor of Engineering, A.M. KONAKHIN, Candidate of Engineering,
O.P. SHINKEVICH, Candidate of Engineering, A.I. FASULLINA, Post Graduate Student

The article is devoted to the comparative thermodynamic analysis of two systems of steam condensate gathering and reuse at the large petrochemical association working in the conditions of condensate non-return to a source.

Key words: thermodynamic analysis, systems of steam condensate gathering, recycling of secondary power resources, the energy savings, the savings of resources, energy efficiency.

UDK 621.311.22

SHIFT 300 MW POWER UNIT WITH PK-41 STEAM BOILER INTO HIGH EFFICIENT POWER UNIT

A.V. MOSHKARIN, Doctor of Engineering, B.L. SHELYGIN, Candidate of Engineering, A.B. MELNIKOV, N.V. BAZEEV, Engineers

The article shows the opportunity of increasing economic efficiency of 300 mW power unit at Konakovskay GRES by means of PVD bypassing with heating the part of feed water in turbine water economizer of steam boiler PK-41. The optimal values of PVD bypassing and required surface of heat exchanger are calculated.

Key words: power unit, PVD bypassing part, turbine water economizer, increasing power unit coefficient of efficiency, additional electrical power.

UDK 621.311.22

DKVR-20-13 STEAM BOILER SHIFT IN WATER-HEATING OPERATION MODE

B.L. SHELYGIN, Candidate of Engineering, S.A. PANKOV, Candidate of Engineering

The authors describe the DKVr-20-13 steam boiler shift into water-heating operation mode. The optimal scheme of water distribution throughout the heat surfaces with moderate speeds of heat carrier circulations in pipes and flow resistance of boiler water dust (1,0 kgf/cm²) is calculated.

Key words: steam boiler, water-heating mode, calculation scheme, heat surfaces layout, furnace water-wall, pipes convection beams, circulation speed, flow resistance, temperature of water, boiler efficiency.

UDK 621.311.22

PREDICTION OF BENDS STATE BY USING RESIDUAL DEFORMATION

S.I. SHUVALOV, Doctor of Engineering, A.A. MITUSHOV, Engineers

The authors consider the prediction problem of bends state by using technical diagnostics results. The authors propose to estimate metal structure damageability according to the residual deformation. The article is devoted to the metal degradation process as the superposition of deterministic process with static loads, and stochastic process with the equipment operation transition conditions. To concretize the operational conditions the authors suggest the constructive parameters elements and changing speed of residual deformation and damageability. To receive statistical simulation of the maximum state for the mentioned period of the future operation the authors recommend to hold statistical modelling of the process.

Key words: bends state, creeping, residual deformation, damageability, prediction of the state.

UDK 620.93

MATHEMATICAL MODEL OF FORGE-AND-STAMPING PRODUCTION WITH TWO-LEVEL OPTIMIZATION OF POWER CONSUMPTIONS

V.A. GORBUNOV, Candidate of Engineering

The technique of mathematical modeling of forge-and-stamping production is described. This method allows to simulate processes with optimization of power consumptions when output of products is submitted. The author considers the using of technological parameter technique of “stove-hammer” unit operation stabilization to solve two-level optimization problem.

Key words: mathematical model, forge-and-stamping production, stabilization parameter, optimization.

UDK 662.986

IDENTIFICATION OF MATHEMATICAL MODEL PARAMETERS OF HEAT AND MASS EXCHANGING PROCESSES IN OPEN-TYPE HEAT EXCHANGER

N.N. YELIN, V.E. MIZONOV, Doctors of Engineering, P.V. YAKIMYCHEV, Post Graduate Student

The article contains the calculation formulae for local coefficients of heat and mass exchanging and aerodynamic resistance in the layer of sprinkled nozzle of Rashig rings. The formulae allow to develop the engineering approach to calculate the heat contact utilizer of smoke gases.

Key words: open-type heat exchanger, heat flow, mass flow, moisture content, pressure losses.

ELECTRICAL POWER ENGINEERING

UDK 621.316.99

DETERMINATION OF GROUNDING DEVICE PARAMETERS ON THE BASIS OF INTEGRAL EQUATIONS OF ELECTRIC FIELD IN MATLAB SOFTWARE ENVELOPE

V.D. LEBEDEV, Candidate of Engineering

The article describes the calculation methods of complete grounding devices. The method is based on the solving the integral equations of an electric field with application of Matlab software envelope functions. The accuracy analysis of resistance calculations of the grounding loop with using the control examples of grounding devices resistance according to the Standard of JSK «EES of Russia (CO 34.35.311.-2004) is held.

Key words: grounding device, the integral equations, an electric field, resistance of grounding device, Matlab.

UDK 621.321

RECONSTRUCTION OF 110 KV OPEN DISTRIBUTION DEVICES ON BASIS OF APPLICATION OF VACUUM CIRCUIT BREAKER AND COMPACT MODULAR CONSTRUCTION

A.N. NAZARYCHEV, Doctor of Engineering, D.A. ANDREEV, Candidate of Engineering, I.N. SULYENKOV, Assistant, D.L. PANKOV, T.A. ZHULINA, Engineers

The authors consider the technical reconstruction problems of 110 kV open distribution devices of substations. It is proposed to use vacuum circuit breakers and compact modular constructions in building the new substations, reconstructions, and technical rearmament. The authors pay attention reconstruction of sub-stations with disconnectors and short-circuit switches.

Key words: technical rearmament, compact modular constructions, distributive devices schemes, reliability.

UDK 621.315

PROTECTING IMPULSE DEVICES OF POWER LINES FAULT LOCATION FROM SIMULATION NOISE

A.L. KULIKOV, Doctor of Engineering, A.A. PETRUKHIN, Candidate of Engineering, A.S. SVECHNIKOV, Engineer

The authors describe the algorithm of influence compensation of simulation noise for impulse devices of power lines fault location. The authors assess the effectiveness of protection algorithm from simulation noise.

Key words: noise immunity, reflectometer, protection from simulation noise.

UDK 621.311

POINTS OF MINIMUM VOLTAGE AS SPECIAL FEATURES OF WEAK CIRCUIT SECTIONS

V.G. NAROVLYANSKIY, Doctor of Engineering, V.V. KURMAK, Post Graduate Student

The authors consider the special features of using the points of minimum voltage at the weak circuit sections as the signs of deterioration of power engineering system stability.

Key words: stability breach, parameter region, diagram of voltage change, reactive power, electric center of oscillation.

ELECTROMECHANICS

UDK 621.313

SIMULATION AND RESEARCH OF ELECTROTECHNICAL SYSTEM OF ADJUSTABLE SEPARATION OF NON-MAGNETIC MATERIALS WITH USING NANO-DISPERSED MAGNETIC LIQUIDS

Yu.B. KAZAKOV, Doctor of Engineering, Yu.I. STRADOMSKY, Candidate of Engineering, V.A. FILIPPOV, Engineer

The authors describe the simulation and research of electrotechnical system of adjustable separation of non-magnetic materials with using nano-dispersed magnetic liquids. The calculation of pressure upon non-magnetic body in a magnetic liquid volume is carried out with a power method. The authors calculate forces, operating on non-magnetic bodies in the magnetic liquid which is in a non-uniform magnetic field. The results of calculations are confirmed by experimental researches.

Key words: magnetic liquid, magnetic liquid separator, power method.

UDK 621.313

TRACTION ENGINES ON PERMANENT MAGNETS IN ELECTRIC DRIVE

V.V., LOKHNIN, Doctor of Engineering I.A. BERBIRENKOV, Post Graduate Student

The article deals with the valve traction engine which is a contactless analogue of traction engine of direct current. This valve traction engine has supplementary advantages. They are reliable excitation and the losses absence on it, the possibility of working with the power coefficient equaled one or less zero.

Key words: valve traction engine, traction electric drive, electromobile, tractive storage battery, engine with excitation of permanent magnets.

UDK 621.9

APPLICATION OF MAGNETIC MICROCAPSULES AS CUTTING FLUID WHILE CUTTING OF METAL

A.G. NAUMOV, V.N. LATYSHEV, Doctors of Engineering

This article presents the results of theoretical and experimental researches of possibilities to apply the magnetic microcapsules as a cutting fluid.

Key words: cutting fluid tools, cutting of metal, microcapsules.

UDK 621.313

RESEARCH OF TRIBOLOGICAL CHARACTERISTICS OF METAL-CONTAINING ADDITIVES TO OILS USED IN ELECTRIC MACHINES

V.A. POLETAEV, Doctor of Engineering, V.V. KISELEV, Candidate of Engineering

The authors consider the additives to oils for the usage in the electric machines. Tribological characteristics of additives are given.

Key words: tribological characteristics, additives, non-wear friction, corrosion stability.

UDK 621.928

MODELLING OF MECHANICAL PROCESSES IN JET MILL OF BOILING BED BASED ON BOLTZMANN EQUATION

V.P. ZHUKOV, H. OTWINOWSKI, Doctors of Engineering, A.N. BELYAKOV, D. URBANIAK, Candidates of Engineering

The authors suggest a generalized description of the combined processes of motion, grinding and classification of granular materials based on the Boltzmann equation. The authors compare the calculated and experimental results of the combined processes of grinding and material classification in the jet mill of boiling bed.

Key words: the Boltzmann equation, mechanical processes, grinding, classification, transportation, granular materials.

AUTOMATION CONTROL SYSTEMS

UDK 621.313

RESEARCH OF ELECTRIC DRIVE SUPPLY FOR MACHINE-TOOLS WITH NUMERICAL PROGRAM CONTROL

A.P. BURKOV, E.V. KRASILNIKYANTS, Candidates of Engineering, A.A. SMIRNOV, Post Graduate Student, N.V. SALAKHUTDINOV, Engineer

The article is devoted to the test results of the experimental model of electric drive supply for machine-tools with numerical program control. Electric drive was made by specialists of STC «INELSI». The authors assess the operation quality of the with location regulator and velocity loop and usage peculiarities.

Key words: electric drive, tests, machine-tool construction, digitization.

UDK 681.5.11

SYNTHESIS OF FOLLOW-UP ELECTRIC DRIVE OF TELESCOPE'S AZIMUTH AXIS WITH REFERENCE MODEL IN POSITION CONTOUR

G.L. DEMIDOVA, Assistant, S.Yu. LOVLIN, M.Kh. TSVETKOVA, Post Graduate Students

The article presents the structure of control algorithm for the follow-up electric drive with reference model in the position contour. The authors present the results of structural and parametric optimization, aimed at step mode eliminating.

Key words: control system, regulator, reference model, step mode, dry friction.

METHODS OF MATHEMATICAL SIMULATION

UDK 621

PROGNOSTICATING PROBABILITY OF FIRE WITH CONNECTIONIST ALGORITHM ON MULTIPROCESSOR COMPUTER

F.N. YASINSKIY, Doctor of Physics and Mathematics, O. V. POTEKINA, Candidate of Chemistry,
S.G. SIDOROV, Candidate of Engineering, A.V. EVSEEVA, Post Graduate Student

The authors consider the new approach to assess the prognostication quality of fire probability by means of artificial neural networks. The necessity of usage of multiprocessor computer for realization of this algorithm is proved.

Key words: meteorological parameter, developing of predictive model, neural network, long term prediction, random-search algorithm.

UDK 004.032.26

RECOGNITION OF LARGE NUMBER OF PATTERNS WITH USING NEURONAL NETWORKS AND MULTIPROCESSOR SYSTEMS

F.N. YASINSKY, Doctor of Physics and Mathematics, A.S. MOCHALOV, Post Graduate Student

This article describes the parallel training algorithm of artificial neural networks using multi-processor systems. Also in this article presents the results of testing the described algorithm on a cluster ISPU «ENERGY».

Key words: neural networks, pattern recognition, learning of neural networks, multiprocessor systems, parallel algorithm, backpropagation algorithm, selection of neural network structure.

UDK 621.311

DEVELOPING Y-Z CALCULATED HYBRID MATRIX WITH COMPLEX COEFFICIENTS OF TRANSFORMERS' TRANSFORMATION

N.P. BADALYAN, Doctor of Engineering

The author considers the issue of developing the Y-Z calculated hybrid matrix with transformation complex factors of a transformer. The matrix is used for developing the systems of nonlinear algebraic equations of the established mode in the electropower system.

Key words: power engineering system, reference node, matrix, established mode, coefficient of transformer's transformation. power engineering, hybrid matrix.

UDK 517.55

DEFINING HOLOMORPHIC FUNCTION OF SEVERAL COMPLEX VARIABLES

B.S. ZINOVIEV, Candidate of Physics and Mathematics, V.P. KRIVOKOLESKO, Candidate of Physics and Mathematics

The authors prove the equivalence of different approaches to define holomorphic functions of several complex variables.

Key words: holomorphic analytical functions, several complex variables.

COMPUTER SCIENCE AND INFORMATION TECHNOLOGIES

UDK 658.783:681.3

INFORMATION SYSTEM OF ELECTRONIC PROCUREMENT IN AGRICULTURAL CONSUMER COOPERATION

A.N. SEREGKIN, Candidate of Engineering

The description of the information system of electronic procurement in agriculture consumer cooperatives system, which has 3-level structure. The application of the information system promotes the competitive advantage, improves the efficiency of agricultural cooperatives and reduces market risk.

Key words: information system, electronic procurement, consumer cooperatives.

UDK 004.31

PARAMETERIZATION OF CONTROL TASKS AS TOOL FOR INCREASING TESTS RELIABILITY IN SYSTEMS OF COMPUTER LEARNING

E.R. PANTELEEV, Doctor of Engineering, A.L. ARKHIPOV, Post Graduate Student

The article contains the method of increasing the tests reliability for computer training, based on the representation of the control questions as a template with variable parameters is proposed. The basic problems of development and using of parameterized questions are considered. A distributed architecture of knowledge control components for supporting parameterized questions is described. An example of its implementation is included.

Key words: computer learning, computer-assisted testing, reliability of computer-assisted testing.

UDK 658.783:681.3

CLASSIFICATION OF MATERIAL RESOURCES OF MULTIPRODUCT WITH CONDITION OF THEIR INTERCHANGEABILITY

G.L. VINOGRADOVA, Candidate of Engineering, E.A. DEMCHINOVA, Senior Teacher

The description of classification signs system is considered. The classification of material resources for multiproduct manufacture with the condition of their interchangeability is carried out.

Key words: classification, material resources, multiproduct manufacture.

ECONOMICS

UDK 338.1

INNOVATIVE POTENTIAL OF POWER GRID COMPANIES

O.E. IVANOVA, Post Graduate Student

The article considers problems and prospects of power grid companies' innovative development in Russia and abroad on the basis of Smart Grid technology. The author gives her own point of view on innovative potential structure, and on its basis designs the integral index of innovative potential.

Key words: innovative activity, power grid companies, Smart Grid, innovative potential.

UDK 65.012

ON ISSUE OF FINANCIAL SUSTAINABILITY OF CLASSIFICATION AND ENTERPRISE POTENTIAL

A.V. SHEKSHUEV, Post Graduate Student

The article deals with the classification of financial sustainability. The author shows the shortcomings of traditional approaches to this classification and proposes his own typology of forms of financial sustainability. It is distinguished by the introduction into the classification of a higher order units - the classes and types. On this basis the need to estimate of new kind of enterprise's sustainability is identified as the potential financial sustainability.

Key words: financial sustainability of the enterprise, classification of financial sustainability, the typology of forms of sustainability, the potential financial sustainability.

UDK 331.101.38:331.2

THE USAGE OF LABOR POTENTIAL IN RUSSIAN ECONOMY: RETROSPECTION AND THE PRESENT TIME

Kh.A. ABDUKHMANOV, Applicant

The article deals with the research results in the field of labor potential of Russian economy in retrospective and present day aspects. The author systematizes positive and negative trends in labor potential realization within the transition (perestroika) period and concretizes directions of its development today.

Key words: labor potential, management, underexploitation of labor potential, overproduction of labor force, effectiveness of labor potential utilization.

UDK 336.14

STRUCTURE AND CLASSIFICATION OF NON-TAX INCOMES OF LOCAL BUDGETS

A.V. IVANOV, Candidate of Science

In the article is considered perfection of classification local budget's non-tax incomes which promote to increase responsibility of local governments.

Key words: local budget, classification, structure, non-tax incomes.

SOCIAL AND HUMANITIES RESEARCH

UDK 338.24:316.77

POLITICAL FUNCTIONS OF MASS-MEDIA

S.J. LISOVA, Candidate of Politics

In the article the problem of differentiation of mass-media activity is investigated. The author suggests the classification of media functions in the political process. The general (information, estimated, control, agency, cultural-educational, regulating, and communicative) and special (mobilization; aggregation; a consensus; advertising; show; conversion; performance) functions are designated.

Key words: function, functioning, mass media, political system, informing, about the control.

UDK 004.8

APHORISM IN FRENCH CLASSES AT A TECHNICAL UNIVERSITY

A.P. SHUMAKOVA, Candidate of Philology

The author considers the opportunities of didactic usage of aphorisms and quasi-aphorisms. The article contains exercises on the form and contents of aphorisms which allow improving different kinds of linguistic and non-linguistic skills and competences.

Key words: French aphoristics, aphorism functions in speech, aphorism pragmatic function in teaching French, quasi-aphorisms, transforms of classical aphorisms, ironic expressions, language games.

UDK 004.802

SYSTEM OF CHECKING SKILL FOREIGN SPOKEN CONTACT (The English Language)

E.B. STAROVEROVA, Applicant

This article studies the problem of methods of oral skills assessment. The system of objective testing of speaking necessary in modern education is discussed. The criteria of effective assessment are given.

Key words: oral skills, methods of assessment, speech marking, criteria for marking.

UDK 316.4.066

DEVELOPMENT OF SMALL CITIES IN RUSSIA: PROBLEM OF MUTUAL UNDERSTANDING OF POWER AND SOCIETY

A.V. SIVOKON, Post Graduate Student

The problem field generated now round social and economic development of small cities of Russia is considered. The factors interfering mutual understanding of key problems of development of small cities between local governments and the public on an example of the Ivanovo area are analyzed.

Key words: small city, public relations, social and economic development, PR-methods.

UDK 94(497.1)

ECOLOGICAL AND LEGAL ASPECTS OF YUGOSLAVIA'S BOMBINGS IN 1999

S.S. NOVIKOV, Candidate of History

The article is devoted to the negative consequences of the NATO Operation Allied Force in former Yugoslavia in 1999. The core of this article is that the choice of targets violated the international laws of war, including the Geneva Conventions and other international ecological and environmental acts. The article offers major recommendations.

Key words: NATO, UN Security Council, UN Charter, The Geneva Convention, ecology, the security, the international Law.

UDK 355.58

AIMS OF LOCAL ANTI-AIRCRAFT DEFENCE IN CITIES, LIBERATED FROM GERMAN-FASCIST INVADERS IN ELIMINATING THE OCCUPATION CONSEQUENCES

A.V. GUSEV, Candidate of History

The article deals with aims and measures carried out by local authorities, headquarters and military units of local anti-aircraft defence in cities, suffered from enemy's air raids and liberated from German-fascist invaders in eliminating the aftermath of the occupation and in restoring the national economy.

Key words: local anti-aircraft defence, military units, headquarters, air force, civil protection, elimination the aftermath, blackout.

UDK159.928

PECULIARITIES OF TEACHERS' LIFESTYLE IN TECHNICAL UNIVERSITY IN MODERN SOCIAL AND ECONOMIC CONDITIONS

O.V. KULIGIN, Doctor of Medicine, A.V. IVANOVA

The research results of the teachers' lifestyle in a technical university on the example of Ivanovo State Power University, their attitude towards health, obstacles in the way of healthy lifestyle and issues of psychological relationship within family, team and students is discussed and analyzed.

Key words: lifestyle, healthy lifestyle, health, psychological relationship.