

Abstracts

ELECTROENGINEERING: Prominent events and great names

Baranov M.I.

Enriko Fermi – one of the founders of quantum statistics, electrodynamics and nuclear power engineering

A brief scientific-and-historical essay about the main achievements and discoveries in physics

5 and atomics made by the prominent physicist of the 20th century Enriko Fermi is given.

Key words – physics, atomics, quantum statistics, electrodynamics, nuclear power engineering, scientific-and-historical essay.

Electrical Mashines and Apparatus

Bolyukh V.F., Markov A.M., Luchuk V.F., Shchukin I.S.

Investigation of induction motor operation with acceleration and braking phases of the operating process

Details of induction motor operation with accelerating and braking phases of the operating process are investigated. Electromechanical process peculiarities under the armature's startup holding by a forcing device and under its abrupt braking resulting from interaction of the striker with a target object are revealed. Criteria for the motor efficiency estimation are introduced. A pilot motor intended for computer information protection by means of hard disk perforation is made and tested.

Key words – induction motor, accelerating and braking phases, electromechanical process peculiarities, pilot motor.

Burkovsky A.N., Rybalko O.A.

Comparison of load-carrying capacity of enclosed asynchronous motors in S3, S4, S5 recursive short-time modes

Well-posed calculation algorithms for permissible stator winding current in an enclosed asynchronous short-circuited rotor motor in S3, S4, S5 recursive short-time modes are introduced, calculation for a number of several explosion-proof motors in these modes made subject to stator winding temperature fluctuations. Load-carrying capacities of motors of various output and rotation frequency are compared in the S3, S4, S5 modes.

Key words – asynchronous motor, recursive short-time mode, load-carrying capacity.

Gurevich V.I.

High Current Pulse Transducer for Metal-Oxide Surge Arresters

High-voltage arresters of 160 kV and higher voltage types based on zinc-oxide varistors are important and expensive devices. The main imperfection of existing devices for the varistors monitoring is necessity of human intervention to work with them. A simple automatic high-current pulse transducer included in SCADA system by means of a radio transmitting- receiving set and intended for the arresters control is introduced.

Key words – high-voltage arrester, zinc-oxide varistors, monitoring, automatic high-current pulse transducer.

Klimenko B.V.

International Electrical Vocabulary – Ukrainian prospects

The paper considers a number of problems concerning implementation of terms and definitions from International Electrical Vocabulary (IEV). An extensive discussion among specialists as for proper translation of IEV terms into Ukrainian is recommended to launch. To make the first step towards this discussion, we begin publication of unofficial translation of one of the IEV sections, namely, section 441 - Switchgear, controlgear and fuses.

Key words – International Electrical Dictionary, terms and definitions, proper translation, extensive discussion.

Korol E.G.

Analysis of magnetic characteristics modeling methods applied to electromagnets for power equipment magnetic field compensation

Existing methods based on analytic form of magnetization curves are analyzed. Advantages and short-comings of every method are given. Ways of the methods improvement are proposed concerning increase in accuracy of modeling core material magnetic characteristics for electromagnets intended for magnetic field compensation.

Key words – magnetic field compensation, electromagnet, core, material, magnetic characteristics, modeling.

Luschick V.D., Dyachenko V.V.

Improvement of three-phase inverter-fed induction generator

An automobile induction inverter-fed generator is considered, the armature winding coils and field winding coils located on the generator stator projections. Different ways of the generator improvement are studied.

Key words – automobile induction inverter-fed generator, improvement.

Malyar A.V.

Mathematical simulation of processes in an asynchronous motor of a deep-well pumping unit

A problem of rational choice of a mathematical model for a deep-bar asynchronous

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motor to study dynamics of a deep-well pumping unit electric drive is considered.

Key words – **deep-bar rotor, oil producer, variable moment, electric drive.**

Mishin V.I., Kozyrsky V.V., Kaplun V.V., Kulinich A.N., Makarevich S.S.

A compensated asynchronous generator for self-contained power-supply systems

The basic theoretical grounds and physical processes in a compensated asynchronous machine operating as a generator are considered.

Key words – **compensated asynchronous generator, basic theoretical grounds, physical processes.**

Sebko V.V.

An error estimation technique for joint measurement of magnetic permeability, specific electric resistance and temperatures of a ferromagnetic product via a contact resistor-inductive method

Error calculation for a contact working converter (CWC) realizing a resistor-inductive method with the help of a developed parameter measurement error calculation technique for a ferromagnetic product is made, the parameters of $\delta\mu_{rt}/\mu_{rt}$, $\delta\rho_t/\rho_t$ and $\delta t/t$ measured. Temperature dependences of relative product-parameters measurement errors are obtained.

Key words – **magnetic permeability, temperature, contact working converter, ferromagnetic product.**

Tkachuk V.I., Bilyakovsky I.J., Kopchak B.L.

A positional (observing) electric drive based on a switched reluctance motor with energy buffer

Structural schematics and an electrical schematic of a four-section controlled switched reluctance motor with a consecutive buffer of energy are given. Mathematical models and

computer programs for research into electromechanical processes are described. Results of calculation of transient and quasisteady-state modes of operation of an electric drive based on the controlled switched reluctance motor are submitted.

Key words – **switched reluctance motor, buffer of energy, mathematical models, electric drive.**

Sharaban Yu.V., Finkelshteyn V.B.

Calculation of moment of inertia for an attached flywheel excluding acceleration action on asynchronous motor speed-torque characteristic measurement

A calculation method for moment of inertia of a flywheel attached to the shaft of an asynchronous motor excluding acceleration influence on speed-torque characteristic measurement is introduced. The method is used for high-speed motors characterization under acceleration on an experimental setup.

Key words – **moment of inertia, asynchronous motor, speed-torque characteristic, testing.**

Shumilov Yu.A., Ponomarenko V.K., Kuz'min V.V., Demidyuk B.M.

Color “appearance”: a new level of roentgen diagnosis

The paper presents a method of color treatment of black-and-white roentgenograms that allows substantial increase in information capacity and makes it higher than information capacity of traditional color treatment of roentgenograms as much as several hundred times. The proposed method gives wide possibilities in non-destructive testing for upcoming defects detection.

Key words – **black-and-white roentgenograms, color treatment, high information capacity.**

Electrical Engineering: Theory

Assuirov D.A.

Research on an active DC magnetic field shielding system

The paper presents results of research into efficiency of DC magnetic field shielding by means of a current loop system, the current loops located on the surface enveloping magnetic field sources.

Key words – **magnetic field, direct current, shielding.**

Pentegov I.V., Krasnozhon A.V.

Influence of ferromagnetic medium parameters on surface impedance components value

A feasibility of ferromagnetic medium surface impedance calculation on the basis of universal approximations of the modulus and argument of complex magnetic permeability is shown. Families of surface impedance coefficients for different construction materials have been built, analysis of the families conducted.

Key words – **skin-effect, surface impedance, complex magnetic permeability, universal approximation, ferromagnetic medium, surface impedance coefficients.**

High Electrical and Magnetic Field Engineering

Pentegov I.V., Volkov I.V., Prystupa A.L.

On calculation of Tesla processes at wireless power transmission

A new model of wireless power transmission via Tesla circuits is presented. The model analysis is carried out, the basic formulas are derived and several parameters are diagramed. Results obtained

70 show a feasibility of the model application to portable electronic device battery charging. The performed research is one more step towards creation of theory of Tesla processes.

Key words – **Tesla processes, wireless power transmission, displacement current, battery charging, partial capacitances.**

Education Structure in "Electrical Engineering" and "Electromechanics"

Milykh V.I., Maistrenko A.M.

Virtual reality and development principles of a virtual laboratory for transformers and electric machine

Modern software and hardware virtual reality toolkits allowing development of real-world process research systems and learning systems that are impossible, in most cases, to realize in real-world conditions are considered. On this basis, principles of mathematical and graphic models of transformers and electric machines for a virtual laboratory development are presented.

Key words – **virtual reality, hardware, electric machine, transformer, virtual laboratory, virtual reality toolkit.**

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Tolmachov S.T., Ilchenko A.V.

A computer-based testing system for "Theoretical Electrical Engineering" discipline

Some questions of the content of "Theoretical Electrical Engineering" discipline and ways of education quality improvement are discussed. Features of educational program "Electronic practicum for theoretical basis of electrical engineering" are considered. The program can be used as a universal facility for computer-aided testing of students with the purpose of their independent work activation. The program is developed in Electromechanical Engineering Department of Kriviy Rih Technical University. A Ukrainian- and a Russian-language program versions in local and network variants are realized.

Key words – **theoretical electrical engineering, teaching quality, electronic practical work, computer-aided testing.**

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