

Abstracts

ELECTROENGINEERING: Prominent events and great names

Baranov M.I.

Oliver Heaviside and his requirements to the world treasure of science

A short essay on the scientific activity of the prominent English physicist Heaviside played an important role in the development of classical elec-

5 trodynamics, operating calculus and theories of wire and wireless electrical communication is presented.

Key words – **electromagnetic theory, history, requirement, operating calculus, electrical communication.**

Electrical Mashines and Apparatus

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

Research on a Dynamic Induction Motor Excited from a Low-Voltage Capacitive Accumulator

Efficiency criteria for a dynamic induction motor operating in various modes are introduced. The motor operation is studied under excitation from a capacitive accumulator providing various inductor current pulse shapes. Utilization of a low-voltage high-capacitance capacitive accumulator is advisable for a small number of the inductor winding turns and a large cross-section of the inductor conductive bus. A motor model intended for platter punching is built and tested.

Key words – **dynamic induction motor, low-voltage capacitive accumulator, efficiency criteria, inductor current pulse shapes, platter punching.**

Golenkov G.M., Bondar R.P.

Application of a vibroexciter with an induction motor for drifting operations

Problems of application of various methods of trenchless well-drifting are considered. Existing designs are analyzed and estimation of their functioning is made. A design of a linear induction vibroexciter is introduced, theoretical grounds of its operation elaborated.

Key words – **trenchless technology, linear induction motor, magnetizing force.**

Petrushin V.S.

Present status and prospects of adjustable-speed induction motor production

A survey of current designs of adjustable-speed induction motors is presented. A rational system

15 approach for the motors design and optimization is proposed. Economic efficiency of adjustable-speed induction motors application in electric drives with semiconductor converters is substantiated.

Key words – **electric drive, adjustable-speed induction motor, design, optimization.**

Stavinsky A.A., Stavinsky R.A., Plakhtyr O.O.

Methods of special requirements assurance for electric power equipment based on transformers and transformer converters with spatial structure of the active part

Directions and engineering solutions of providing required electromagnetic compatibility factors and improving special transformers on the basis of spatial structure of the active part with parallel shaping surfaces of winding windows and rods are analyzed.

Key words – **electromagnetic compatibility, low-magnetic transformer, converter transformer, controllable transformer.**

Tchaban A.

Features of Ψ - and A-models of an induction motor in phase coordinates

A comparative analysis of Ψ - and A-models of an induction motor in phase coordinates is suggested. A new approach for building A-models of an induction motor in phase coordinates is introduced. Differential equations of the A-model are presented in Cauchy normal form. Results of currents and motor speed computation are used to show advantage of A-model in computation practice.

Key words – **induction motor, phase coordinates, A-model, computation.**

Electrical Engineering: Theory

Bezprozvannykh A.V.

Hygroscopic humidifying of a polyethylene-sheathed telephone cable

For two years, a telephone distribution cable has been in a vessel relative humidity in which made practically 100 %. Capacitance and dielectric loss tangent have been periodically measured. It is revealed that with time, swelling, along with humidifying, of polymeric polyethylene sheath and isolation is observed. Hygroscopic moisture from the earth surface penetrates into the material and dissolves. Thus, the thickness of the isolation and the sheath increases, while the length – decreases.

Key words – **telephone cable, electric capacity, dielectric loss tangent, hygroscopic moisture, humidifying.**

Zavgorodniy V.D.

A quantum mechanical model of induction-type angle transducers (Part 6 Contactless limited-angle transducers)

New designs of contactless limited-angle transducers based on transversal magnetic flux

40 structures are described. Results of the designs analysis on the basis of M.Faraday's ideas and terminology and their comparison with experimental data are given.

Key words – **induction angle transducer, contactless angle transducer, limited angle transducer, electro-tonic state.**

Lupikov V.S., Krjukova N.V., Mashnev A.J., Petrov S.V., Pelevin D.J., Shubcov V.J.

Improvement of a magnetic field homogeneity in the working volume of a magnetic measuring stand

Experimental researches of magnetic field distributing in the working volume of a magnetic measuring stand of the Magnetism Department of Electrodynamics Institute of National Academy of Science of Ukraine are resulted. Recommendations on increasing of measuring exactness on the stand are given for the permanent external magnetic field.

Key words – **electrical equipment, space device, external magnetic field, measurement, magnetic measuring stand, working volume.**

Pavlenko T.P.

Quantum mechanical calculation of Richardson effect current

The paper considers expressions for calculating thermal electron emission current and shows conditions that determine values of switching current and cathode voltage drop on the basis of electric-and-mass transfer equations. Also, cathode spot effect on energy balance under deceleration and recombination emissions is estimated.

Key words – **Richardson effect, current, electric-and-mass transfer equations, energy balance.**

Pjeljevin D.E.

Magnetic moment of a set of electromagnets - magnetic field compensators

Problems of magnetic interaction of aggregate electromagnets used for geomagnetic field distortion removal within the local space of household and industrial objects (residential and industrial rooms) are considered. An analytical model of magnetic moment of a set of electromagnets is developed. The model takes into account complementary factors, namely, nonlinear magnetic characteristics of the electromagnets and magnetic coupling between them.

Key words – **magnetic field, magnetic moment, aggregate electromagnets, field compensator, analytical model.**

Sebko V.P., Bezzaponnaya V.M.

About diffusion of decaying magnetic fields into a metal chamber

In the paper, theoretical and experimental research on slowly-changing decaying magnetic

54 field penetration through the walls of metal chambers is reported. Experimental data obtained are in good agreement with analytical results.

Key words – **magnetic field, metal chamber, physical model, calculation.**

Timchenko N.A., Chernaj V.F., Asmolova L.V.

Power stabilizer processes simulation

In the article, a problem of instantaneous power redistribution is solved aiming at maintaining given current, voltage and power parameters depending on changing frictional load, with application of a power source with stabilized output load. It is shown that changing transformation ratio of the power source results in maintaining stable output power.

Key words – **power stabilizer, instantaneous power redistribution, simulation, output power maintenance.**

Khvorost M.V., Goncharov Yu.P., Panachenko M.V., Zamaruev V.V., Chumak V.A., Panachenko N.M., Nikulin V.S.

Switching types and energy characteristics in electric circuits with switching elements

An energy criterion of switching process, namely, switching power, is introduced, which will make it possible to describe energy phenomena in electric circuits with switching elements. With application of this criterion, switching classification is made, and a class of uniform-switching circuits that allows obtaining excellent energy data, improving electromagnetic compatibility, and simplifying switching control, is distinguished.

Key words – **electric circuit, switching process, energy characteristic, criterion.**

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Electric Transport

Kostin N.A., Mishenko T.N., Gilevich O.I.

Stochastic transient electromagnetic processes in power circuits of electric locomotives under a sharp change in current-collector voltage

A probabilistic-analysis method for stochastic electromagnetic processes in power circuits of rolling stock is introduced. Results of numerical

calculations of emergency-operation processes under voltage removal and its subsequent recovery on the current-collector of the first Ukrainian DC locomotive DE1 are analyzed.

Key words – **probabilistic analysis method, current-collector, emergency transient electromagnetic processes.**

Education Structure in

“Electrical Engineering” and “Electromechanics”

Busel N.P., Mikhaltsov A.P., Murga V.V.

Improving efficiency of laboratory classes in electric engineering through computerization of universal laboratory equipment

Advantages of a concept of close laboratory studies relation for gaining primary practical

79 knowledge with theoretical aspects of electric equipment process analysis and verifying analytical results in laboratory conditions are considered.

Key words – **electric equipment process, theoretical analysis, laboratory classes, computerization.**

Information

Gurevich V.I.

Electromagnetic terrorism: new hazards

A new kind of terrorism is considered, namely, electromagnetic terrorism. The history of development of this kind of weapon is described, and information on countries, companies, and leading experts in the area is given. It is shown that modern power objects are quite vulnerable to intentional electromagnetic action because of wide application of microprocessor-based protective relays and computers. Accessibility of special equipment allows carrying out successful terrorist attacks on such objects.

Key words - **electromagnetic terrorism, intentional EMI, E-bomb, microprocessor relay, electromagnetic interference, cyber-attack.**

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Myasnikov V.E.

On electrical safety classes for electric products

An analysis of existing electric products classification is made in terms of their action on operators and electric-shock protection methods. A new system of electrical safety indices is proposed. Advantages of the system are technology list extension to 12 classes and their differentiation about guaranteed electrical safety levels. The introduced classification is recommended for application in international standards being developed.

Key words - **power equipment, electric shock hazard, electrical safety, classification.**

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