

# Abstracts

## Electrical Mashines and Apparatus

- Bondarenko V.E.*  
**The no contact eddy currents monitoring of electrical and geometrical parameters in cylindrical wares.**  
The methods are considered and a device scheme is chose for no contact monitoring of a diameter and a specific resistance of extended nonmagnetic conductive cylindrical wares in longitudinal and transversal magnetic field. The basic parameters calculation is carried out. The precision characteristics are showed.  
*Key words* - **eddy current, no contact monitoring, cylindrical wares.**
- Borzik V.L.*  
**Approximating of the magnetization curve for steel in the combined electrical machines.**  
In close approximating of the magnetization curve with usage of cubic splines of defect 2, which ensures high accuracy and a smoothness of the curve and its derivatives, is considered.  
*Key words* – **electrical machine, magnetization curve, approximating, cubic splines.**
- Verbovoy A.P., Verbovoy P.F.*  
**Research of voltage value influence on electromagnetic parameters of the coil from the ferromagnetic conductor.**  
Results of experimental researches of the coil from an iron wire are given. It is established, that its active resistance decreases with increase of a feed voltage. The reason for this is reduction of specific electric resistance of a wire. Formulas for its definition are resulted.  
*Key words* – **coil, iron wire, electromagnetic parameters, active resistance.**
- Galaiko L.P.*  
**The account of magnetic losses for want of designing switched reluctance motors.**  
Method of magnetic loss calculation in switched reluctance motor based on calculation of eddy currents are given. Change lows of magnetic field and eddy currents on different regions of magnetic chain, equation for calculation eddy currents loss and results of it calculation for main drive capacity 13 kW are considered.  
*Key words* – **magnetic loss, eddy current, switched reluctance motor.**
- Golovan V.I., Golovan I.V.*  
**Aspects of storing resources by working out of technical decisions of not-synchronous motors with inductive regulator in its rotor circle.**  
Aspects of storing resources by working out of technical decisions of not-synchronous motors with inductive regulator in its rotor circle are considered in the paper, regarding their social needs and influence on the environment and society.  
*Key words* – **not-synchronous motors, inductive regulator, technical decision.**
- 5 *Dorokhov A.V., Finkelshteyn V.B.* 24  
**Softening electrodynamic overloads at hooking up to network of induction generators wind turbines.**  
The technique of calculation of transient currents and moments at hooking up of asynchronous generators to a network is designed. The opportunity of their decrease is shown at the expense of non-simultaneous hooking up of phases of the generator winding to parallel operation with the network. The guidelines on formation of optimal algorithm of actuation are given. The phenomena attendant to transient is described.  
*Key words* – **asynchronous generator, transient current, moment, connection to the network, optimal algorithm.**
- 11 *Zavgorodniy V.D.* 28  
**Quantum mechanical model of induction type angle transducers (Part 2).**  
On an example of induction type precision angle transducer the quantum mechanical approach to the analysis of energy and information conversion processes between stator and rotor as discrete structures in electromechanical converters is advanced. The quantitative parameter of dissymmetry for systems containing symmetric structures is established. The recommendations upon the choice of design structural parameters of angle transducer are given.  
*Key words* – **electromechanical converter, induction type electromechanical angle transducer, mathematical model, Schroedinger wave function.**
- 13 *Zavgorodniy V.D., Starostin O.S., Petrova O.A.* 33  
**Simulation of geometrical structures for electromechanical converters double-sided gear-form.**  
For electromechanical converters double-sided gear-form the concept of chromosomes construction explicates in view of geometry of active zone in which conversion of energy is carried out. The given concept ensures saving the genetic information of their geometrical primitives. Influence of the converters geometry on structure of output parameters is researched. Application of the dissymmetrical principle is shown during complicating structure of the converters.  
*Key words* – **electromechanical converters, geometrical primitives, chromosomes construction, dissymmetrical principle.**
- 17 *Lupikov V.S.* 38  
**Method providing adjustment of switchboard system for compensation of its magnetic field.**  
The structure of parametrical system for automatic compensation of the external magnetic field created by conductors of the switchboard power circuit near to its surface is considered.

The method providing adjustment of the system electromagnets-equalizers parameters is offered according to magnetic measurements. Application of such system allows effectively compensate the magnetic field up to a level which is meeting the requirements of electromagnetic compatibility.

**Key words – switchboard, power circuit, external magnetic field, electromagnets-equalizers, adjustment.**

*Mischenko T.N., Mihalichenko P.E., Kostin N.A.* 43

**The probability characteristics of stochastic voltage function on current collector of the first Ukrainian locomotive DE 1.**

The results of researches of stochastic voltage variation process on current collectors of DC electric locomotives types DE1 and VL8 are set up. Are obtained and analyzed basic function of voltage oscillations and its normalized spectral concentration. The uncanonical decomposing of the voltage as fixed stochastic process is executed. of An average number of lets for the electric locomotive DE 1 is calculated.

**Key words – locomotive current collector, voltage function, probability characteristics.**

*Namitkov K.K., Klimenko B.V.*

**Electric arch: 200-years anniversary of the great discovery.**

The history of an electric arch discovering by V.V. Petrov is described. The basic scientific and technical consequences of this great discovery are considered.

**Key words – electric arch, discovery, historical review, scientific and technical consequences.**

*Postolnyk N.V., Sereda A.G.*

**Advantages and application prospectivity of high pressure discharge lamps type AMP.**

In close advantages of high-pressure discharge lamps as compared with other sources of light on basis of high-pressure arc discharge are reviewed. The prospectivity of their perfection and areas of application are analyzed.

**Key words – sources of light, high-pressure mercury lamp, high-pressure sodium lamp, halogen lamp, fluorescent lamp, application prospectivity.**

*Rassalsky A.N., Solodunenko D.V.*

**Mathematical model of drying process in isolation of current transformers.**

*Soskov A.G., Alaev P.N., Soskova I.A.*

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**Calculation of heating in power thyristors with soldered contacts used in electronic keys exposed by current impulses of arbitrary form.**

On the basis of symmetrical three-zonal thermal model of power thyristors with soldered contacts is offered and analytical expressions for thermal mode of these thyristors at effect of current impulses of the arbitrary form are obtained.

**Key words – thyristors, electronic keys, current impulse, thermal mode.**

*Tchaban V.I., Kovivchak Ya.V., Kashkalov V., Tchaban A.V.*

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**Computation of commutation voltage increase in an induction motor witch is power supplied for cable.**

In close the method of commutation voltage increase in a saturated induction motor witch is power supplied for cable is proposed. The system of differential equations in normal Cauchy form is written. The outcomes are useful for optimization of motor ensue in view of commutation voltage increase by condenser battery. The results of computer simulation are given.

**Key words – induction motor, transient process, mathematical model, voltage increase, cable, condenser battery.**

*Shinkarenko V.F., Platkova N.O.*

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**Genus category in the taxonomy structure of the evolutionary electric machines systematic.**

The systematic problem of electric machines is investigated. The genetic criteria of rank and kinds' boundaries of electric machines in the taxonomy structure systematic are substantiated. The genetic fund structure and evolution peculiarities of the kind's model are considered. The analogies' reasons in the hierarchy of the basic taxons' systematics of the electromechanical and biological systems is explained. The prognostic properties of the evolutionary electric machines systematic are shown.

**Key words - electric machine, evolution, systematic, taxon, basic genus, genetic code, the original field source, prognostication.**

## High Electrical and Magnetic Field Engineering

*Baranov M.I.*

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**Electrothermal stability of isolated wires and cables to the action of strong impulse lightning currents.**

Outcomes of researches of electro thermal stability of isolated wires and cables testing effect

stability and electrical explosion are defined at a direct stroke of the lightning current depending on its amplitude. Numerical averaged values of maximum permissible and critical denseness of the current are obtained for cores (screens) of researched wires (cables).

*Key words* – **isolated wires and cables, electrothermal stability, direct lightning stroke, lightning currents, ultimate permissible and critical densities lightning current impulse.**

*Baranov M.I., Bocharov V.A., Ignatenko N.N., Kolobovsky A.K.*

**Powerful generators of pulse voltages and currents with top parameters for testing of power electroenergetic equipment.**

Some basic electrical schemes, constructions and technical characteristics of operative generators of pulse voltage (GPV) and current (GPC) with energy to 1 MJ for outward arrangement. They are intended to produce powerful test pulses with amplitudes consequently of voltage to 4 MV and current to 200 kA, and time duration micro- and milliseconds. These GPV and GPC and their measuring means may be used for testing powerful equipment by standard aperiodic lightning and

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commutation pulses of voltage and current.

*Key words* – **pulse generators, powerful equipment, testing, lightning and commutation pulses of voltage and current.**

*Yuferov V.B., Dryj O.S., Skibenko E.I., Kholod Yu.V., Chernyi O.V., Ilichova V.O., Mufel E.V., Rybalko A.N.*

**Superconducting magnet systems of complicated shape and high density of transport current**

General technological problem at the creation superconducting thermonuclear stellarator type devise are described. Experimental critical currents dependences for short and long samples at the different impregnating and cooling condition are presented. Dependences of the magnetic system heating at different velocities of energy evacuation are measured and discussed. Some making and working specifics are described. Variant of the superconducting magnetic separator with  $B \nabla B = 500 \text{ T/m}^2$  are described.

*Key words* – **superconductivity, torsotron, superconducting impregnating dry winding, critical current, magnetic separator.**

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## Electrical Engineering: Theory

*Boev V.M.*

**Statement of an electromagnetic field calculation task for toroidal transformer in view of convolution magnetic system and an axial coil of its winding.**

For the transformer with twisted magnetic system on the basis of use of break functions and the equation of Archimedes spiral the differential equation describing an electromagnetic field in all space, including the transformer is received. The decision of the equation may be constructed at use of simplifying assumptions or a numerical method.

*Key words* – **toroidal transformer, convolution magnetic system, axial coil, electromagnetic field, calculation.**

*Gorbachev M.N.*

**Development of analytical methods of finding nonharmonic decisions in radio engineering and electric circuits tasks.**

Known and nonconventional methods of finding of the periodical decisions in the closed form for established processes in linear electric and radio engineering circuits with concentrated parameters are discussed with account of influence on them nonharmonic signals of voltage and

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EMF. The example of application of the method for a linear circuit of the fourth order is given.

*Key words* – **electric circuits, concentrated parameters, analytical methods, nonharmonic decisions.**

*Naboka D.G., Kononov B.T., Nechaus A.A.*

**Asymptotical characteristics and similarity of electrostatic fields of solenoids.**

Solenoid coils have a number of special points where occurrence of partial discharge is the most probable. They are points of sharp change of curvature equipotential surfaces on solenoid edges - special points of I type, or points of voltage input, in which growth of potential changed its direction - special points of II type. Asymptotical characteristics of electrostatic fields in these points are different. That is way the definition of the most probable place of partial discharge is unequivocal. For points with identical asymptotical characteristics this problem, on the contrary, has the unique decision due to similarity of fields in them.

*Key words* – **solenoid, electrostatic field, partial discharge, special points, asymptotical characteristics.**

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## Education Structure in

## "Electrical Engineering" and "Electromechanics"

*Zablodsky N.N., Shevzhov L.V.*

**Using of kvalimetry for increasing of preparation students' level in electrotechnical professions.**

The experience of kvalimetry using for determination students' intellect level on initial

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and final stages of the education is stated. Results of using module-rating system of the estimation of knowledge are given.

*Key words* – **kvalimetry, module-rating system, preparation level, students.**