Abstracts

Electrical Mashines and Apparatus

Bezotosniy V.F., Kozlov V.V., Nabokova O.V. **5**

Up-to-date approaches and perspective directions of control systems designing by a force parameter.

Application of electromagnetic systems with a distributed structure is perspective for building of unified magneto resilient converters (MC). This conclusion is made in the article on the basis of analysis of requirements for automated force-parameter control systems with application of force-measuring converters. The basic MC construction which utilizes ferrorubber with one-domain particles and allows increase in MC sensitivity and resolution is introduced.

Key words – **magneto resilient converter, force parameter, ferrorubber, resolution.**

Volkova O.G. **7**

Influence of breaking speed on electric wear of arc-suppressing contacts in high-voltage apparatus.

In the article, influence of breaking speed on electric wear of arc-suppressing contacts is analytically and experimentally investigated.

Key words – **arc-suppressing contacts, breaking speed, power, mathematical model, electric wear.**

Zhemerov G.G., Kolesnik V.Y. **10**

Energization of an asynchronous machine from a self-contained voltage source inverter with PWM under synchronization of the voltage inverter and the mains.

In the article, an energization system for an asynchronous machine is examined on the basis of a voltage source inverter with PWM and subsequent switching to the mains. The feature of the energization system is presence of parallel work interval for the inverter and the mains. Diagrams characterizing the energization process at different torques on the machine shaft are given.

Key words – **asynchronous motor, voltage source inverter, synchronization.**

Zhorniak L.B., Osinskaja V.I., Rajkova E.U., Snigiriov V.M. **17**

The basic directions of high-voltage bushings quality increase for power system equipment.

Questions of reliability and maintenance of electrical insulation in high voltage networks are investigated, technical solutions that allow increasing service life and decreasing prime cost of the device given.

Key words – **high-voltage compound-filled bushing, oil-filled bushing, dry or unfilled type bushing, condenser, oil-impregnated paper-insulated (OIP) bushing, resin-bonded, paper - insulated (RIP) bushing, solid (ceramic) bushing, silicone composite insulators, silphon.**

Konokhov N.N. **22**

Efficiency and Principles of Designing Symmetric Cooling Systems of Electric Machines.

Efficiency of cooling systems **(CS)** and classification of ventilating schemes **(VS)** are analysed on the basis of electric machine **(EM)** cooling theory in term of general symmetric theory. Principles of designing symmetric ventilating schemes of electric machines are also developed.

Key words – **electric machines, symmetric cooling systems, efficiency, analysis.**

Kuznetsov B. I., Vasilets T.E., Varfolomeev A.A. **27**

Synthesis of a predictive neuro-controller for a two-mass electromechanical system.

A predictive neuro-controller used for solving a problem of light-armored vehicle armament guidance and stabilization control is synthesized. The neuro-controller synthesis procedure for a specified control object is described. The neuro-controller parameters significantly acting on control quality are revealed, their optimal values determined. The system simulation is made. The neuro-controller synthesized is shown to provide high dynamic behavior of the system being designed.

Key words – **predictive neuro-controller, neuro-system, armament guidance and stabilization.**

Kuz'min V.V, Shophul A.K., Shpatenko V.S. **33**

Vibromechanics of high-power synchronous generator stators under peripheral magnetization.

Calculations of vibromechanical state of turbo- and hydrogenerator stator cores under peripheral magnetization during thermal tests are made on the basis of new theoretical approaches and experimental data.

Key words – **synchronous generator stator, peripheral magnetization, vibromechanical state, calculations.**

Larin A.M., Guedidi Faouzi Ben Kilani **37**

Experimental determination of synchronous machine equivalent circuit parameters under field winding presentation as a multiple loop circuit.

The basic procedures of an experimental technique for synchronous machine equivalent circuit parameters determination are described, the field winding presented as a multiple loop circuit. The technique is based on simultaneous stator and field winding current recording under a sudden three-phase short-circuit at the electric machine terminals. Results of research on an industrial turbogenerator TBB-160 are given.

Key words – **synchronous generator, field winding electromagnetic parameters, sudden three-phase short – circuit.**

Baru Ju.A., Melnik A.K., Tkachenko S.V., Milykh V.I. **41**

Linear impulse electromotor type and basic parameters decision for nonexplosive sources of seismic vibrations.

The basic problems of theory and designing of linear impulse electrodynamic electromotors for nonexplosive sources of seismic vibrations are introduced. Criteria for electrodynamic and electromagnetic linear impulse electric motors application in these sources are specified depending on power impulse parameters. Optimum duration of power impulse action is determined.

Key words – **impulse electrodynamic electric motor, source of seismic vibrations, type decision, basic parameters decision.**

Polyakov M.A. **45**

Power oil-immersed transformer cooling control by criterion of efficiency.

Ratings of technical and economical efficiency for power transformer cooling are introduced. Principles of their application to regulating cooling and cooling system regulator structure on the basis of efficiency criteria are described, principles of their program implementation in the form of distributed supplement are given.

Key words – **power oil-immersed transformer, cooling control, technical and economical efficiency ratings.**

Sablin O.I. **48**

Instantaneous energy performance of DC electric rolling stock.

Methods of instantaneous power factor and efficiency factor determination for DC electric rolling stock are considered because non-stationary conditions of its power circuits operation require on-line energy analysis taking into account stochastic change in trolley voltage, tractive current, as well as traverse speed and tractive force.

Key words – **DC electric rolling, efficiency factor, energy performance, stochastic change, non-stationaryconditions.**

Shvedchikova I.O. **51**

Information approach application to analysis of electromechanical systems development.

Expediency of applying information approach to analysis of electromechanical system development is proved with an example of magnetic pulleys. Mechanisms of information entropy flow change in the case of innovation occurrence are considered. A parameter for estimation of engineering solutions variety within the limits of an electromechanical objects population is proposed.

Key words – **information entropy, electromagnetic system, magnetic pulley, innovation evolution.**

Electrical Engineering: Theory

Gorbachev M.N., Milka A.D. **56**

A geometric simulation method for periodic non-harmonic power processes and its application in radio engineering.

A new method of mathematical simulation of power processes in electric and radio circuits and systems is introduced, the method based on vector presentation of the total output and its orthogonal components in 3D space.

Key words – **power process, vector presentation, mathematical simulation, electric and radio circuits.**

Reutskiy S. Yu., Assuirov D.A. **58**

On a numerical method of solving Neumann problem in connection with a closed loop control system for external magnetic field in technical objects.

A numerical technique for solving Laplace equation with Neumann boundary conditions is presented. The technique is based on a method of fundamental solutions. Comparison with a method of boundary integral equations is performed. It is shown that the technique developed provides high precision and speed of transformation of initial information about external magnetic field of technical objects, which is important for automated control of the field in a closed loop system.

Key words – **external magnetic field, scalar potential, Neumann problem.**

High Electrical and Magnetic Field Engineering

Baranov M.I. **63**

Experimental detection and investigation of "hot" and "cold" longitudinal areas in a thin metallic wire with a high-density pulse current.

Results of experimental research into a longitudinal heterogeneous periodic temperature field in a thin zincked steel wire with a high-density aperiodic pulse conduction current are presented, the current reaching the peak value of 0,4 kA/mm^2 at the stage of the wire material evaporation.

Key words – **metallic wire, pulse conduction current, high-density current, wave electron package, longitudinal heterogeneous periodic temperature field.**

Baranov M.I., Koliushko G.M., Kravchenko V.I., Nedselsky O.S. **69**

A powerful high-voltage electrophysical setting for lightning overall current imitation and its application in the field of lightning protection of technical objects.

Basic scheme-engineering solutions and attributes of a created powerful lightning overall current imitator forming both separate pulse, intermediate, continuous, and repeated impulsive components of the current and their different combinations are introduced. Results of electromagnetic testing of prototype composite aircraft skin concerning resistance to direct action of lightning impulsive current are described.

Key words – **high-voltage electrophysical setting, lightning current, model test, technical object, lightning protection facilities.**