

# Abstracts

## Electrical Mashines and Apparatus

- Alpatova A.I.*  
**New tasks of transformers designing.**  
Raising of some tasks arising up before the designer-estimator of modern transformers is described, approaches to their decision are given.  
*Key words* – transformer, designing, modern construction.
- Baida J.I., Chepeluk A.A.*  
**Computation of electromagnetic systems with anchor moving transversal and ferromagnetic shunts in working gaps.**  
The results of computation of static loading characteristics of electromagnetic systems with anchor moving transversal by the method of areas and method of finite elements are given. The comparative computation and experimental data analysis which application of these methods domains at designing of the systems are certain on the basis of is conducted.  
*Key words* - electromagnetic system, ferromagnetic shunt, designing, static loading characteristic, computation, experiment.
- Bondar O.I.*  
**Aperiodic process in a nonlinear circuit with an electrolytic furnace for metal depositing by direct current.**  
In the article the analytical relation of cathode polarisation of a precipitation process to parameters of equivalent circuit of an electrolytic furnace for plating deposition by the method of variables' conversion is obtained. The calculation of the circuit with electrolytic furnace of a nickel plating are checked with the numerical method help.  
*Key words* – metal deposition, cathode polarisation, analytical solution, method of variables' conversion.
- Borzik V.L.*  
**Computation method of combined electric machines transitional processes given in non-obvious form.**  
Possibility of algorithm for computation of transitional processes in combined electric machines and its efficiency increase due to cubic splines using is considered.  
*Key words* - combined electric machine, transitional process, computation, cubic spline.
- Golovan V.I., Golovan I.V.*  
**The informational model of asynchronous motors with inductive regulator in rotor chain for acceptance of technical decisions.**  
The conception of the working out of the informational model of asynchronous motors with inductive regulator in rotor chain is proposed. The model permits to choose the optimum strategy for working out different variants of new tasks step by step. The model takes into account intercommunications of elements in static and dynamics and can be used for the analysis and synthesis of technical decisions in the process of engines designing.
- 5 *Key words* – the informational model, the asynchronous engine, the inductive regulator, the technical determination, optimization.  
*Dyachenko Y.Y.* 24  
**Definition of approaches to handling of measuring information in high-frequency moisturemeters.**
- 7 Modern tendencies in handling of measuring information surveyed. Principles of build-up of high-frequency moisturemeters for granular materials are offered.  
*Key words* – moisturemeter, modelling, electric field. 26  
*Zavgorodniy V.D.*  
**Quantum mechanical model of induction type angle transducers (Part III. Analysis of manufacturing deviations influence).**
- Influence of induction type angle transducer parts manufacturing deviation and systematic errors of its power supply on the output signal phase error is analyzed. Methods of these errors removal are offered.  
*Key words* – induction type electromechanical angle transducer, phase error, manufacturing deviation influence. 32  
*Zagirnyak M.V., Usatyuk V.M.*  
**Improvement of the two-phase separator design with E-shaped magnetic system and disk unloading device.**
- The technical decision, allowing increasing technological and economic parameters of two-phase separators with E-shaped magnetic system and disk unloading device is considered. Experimental verification of the offered decision on physical models is executed.  
*Key words* – magnetic separator, unloading device. 35  
*Zekcer D.M.*  
**Some technical decisions for contact springs and of relays.**
- The of mechanical descriptions of string and flat contact springs and their influence on the mass and sizes of relays are resulted. The features of designing lens shells making better operating properties of relays are considered.  
*Key words* – relay, contact springs, shells, comparative analysis. 37  
*Kravchenko A.I., Bovda A.M.*  
**Combined permanent magnets: expansion of permanent magnets classification.**
- The combined magnets made from magnets of different types are examined as a new class of permanent magnets, properties of which are determined by incoming magnets and their volume fractions and also by method of their assembling. The properties of the combined magnet Sm-Co/Nd-Fe-B/Sm-Co, made from magnetic materials of one class, and combined magnet Nd-Fe-B Al-Ni-Co

Fe/Nd-Fe-B, made from magnetic materials of different classes, are experimentally set and described. A conclusion about the prospects of theoretical and experimental research of the combined magnets for their practical application is done.

*Key words* – **permanent magnets, properties, classification, practical application.**

*Rassalsky A.N.*

**Monitoring systems of power transformers.**

The analysis of the state of the transformers exploited in the united power systems networks is resulted. Recommendations on replacement of out-of-date equipment and expansion of functional possibilities of the systems are offered.

*Key words* – **transformer, power systems, out-of-date equipment, functional possibilities.**

*Sebko V.V.*

**Influence of temperature on magnetic permeability and electric specific resistance of conductive cylindrical article.**

Influence of temperature on relative magnetic permeability and specific electric resistance of conducting cylindrical article is considered. It is shown that the specific electric resistance increases approximately in 3 times as compared to growth of relative magnetic permeability of the heated article at the same temperature.

*Key words* - **conductive cylindrical article, magnetic permeability, specific electric resistance, heating.**

*Hudiaev A.A.*

48

**To the problem of reproduction precision improvement in the class of multi-channel reproducing control systems with standard tuning of their channels.**

The effective iterative algorithm rising precision of multi-channel control systems at reproduction of setting impacts is considered. The method of standard channel operators is formulated. Correlations for errors and structural diagrams realizing this algorithm for the two-channel reproducing system are resulted.

*Key words* – **iterative algorithm, standard channel operators, multi-channel control system.**

*Tchaban V.J., Bily L.A., Tchaban A.V.*

53

**The computation of static characteristics in saturated induction motors.**

The computation method of static characteristics in saturated induction motor, based on construction of model sensible to its initial conditions, is offered. Using the Newton iteration method the model equations are solved. The equations of electro-mechanical state and equations of their first variations are integrated on the every iteration. Stable and unstable system states are determined coming from the zero attraction zones. Two steady states of the system, stable and unstable, from the great number of possible ones are calculated.

*Key words* – **induction motor, static characteristics, two point boundary value problem, model of sensitivity to initial conditions.**

## High Electrical and Magnetic Field Engineering

*Baranov M.I.*

56

**Simplified mathematical model of the electrical explosion in conductors under the action of high pulse currents.**

The simplified analytical model of the electric explosion in a cylindrical conductor under the action of great pulse current, time shape of which is varied, is offered on the basis of electro-thermal effect of its electro-explosive destruction.

*Key words* - **conductor, high pulse current, electrical explosion, mathematical model.**

*Baranov M.I.*

59

**Electrodynamics stability of the thin cylindrical conductor to the action of strong pulse currents.**

The discharge current in the thin cylindrical conductor of high-voltage electrophysical installations are considered. The approaching numerical correlation for its requirement amplitude level is proposed providing its electrodynamics stability. The results can find practical application in the technique of strong electric and magnetic fields.

*Key words* - **cylindrical conductor, strong pulse current, electrodynamics stability, numerical correlation.**

## Electrical Engineering: Theory

*Batygin Yu.V., Lavinsky V.I.*

65

**The current distribution along the plane sheet work-piece surface in immediate power source closing.**

Some effects of the current spreading along the work-piece surface in the straight passing the current through the contact system are investigated. Analytical dependencies for calculation of the current distribution along the sheet work-piece in the magnetic pulse system for the metal working under its imme-

*Verbovyj A.P., Verbovyj P.F.*

67

**Complex specific impedance of electric alternating-current circuit.**

Experimental study of coil made of copper and ferromagnetic wire is carried out. The data of specific electric resistance determined by traditional formula and according to Ohm law for current density are compared. It is established that

specific impedance of this wire in Ohm law consists of reactance and inductive components. As a result this impedance is a complex quantity.

*Key words* – coil, copper and ferromagnetic wire, specific impedance.

*Ivleva L.F., Pelevin D.E.*

**Definition of a magnetic quadrupole in technical object by measuring with a static planimetric transducer.**

The parameters of a static planimetric primary measuring transducer permitting to measure tesseral components of a quadrupole magnetic moment in a technical object are calculated.

*Key words* - technical object, quadrupole magnetic moment, tesseral component, measuring transducer.

*Latynin Yu.M., Milykh V.I.*

**Analysis of base state electric engineering standards.**

Base electric engineering standards that define general notions in electric engineering are analyzed on the basis of system approach. Conclusion is made that the standards insufficiently correlate with each other, many statements lacking qualitative components and some definitions not only mismatching their essence but also contradicting each other. Terminology and terms definitions specifications are stated. The base standards need

changing in structure, wording, and definition content to meet the state-of-the-art requirements of electric engineering advancement.

*Key words* - electric engineering standards, analysis, general notions, contradictions, terminology specifications.

*Rudas Ju.D., Lupikov V.S.*

**Analyses of magnetic field produced by multypole source.**

The analysis of the second order surface, representing 3D distribution of the multypole source magnetic field with constant value of induction is fulfilled. The engineering method for determination of geometrical parameters of the surface is developed. As initial dates of measuring induction on three parallel planes located in relation to the source from one side are used. The method allows minimizing the volume of measuring date at the analysis of magnetic field produced by long technical objects.

*Key words* - technical object, multypole source, magnetic field, distribution, analyses method.

73

77

82

## Information

Luchuk V.F., Markov I.S., Schukin I.S.	<b>Protection devices for electric motors on the basis of electronic relays EMPR-6, EMPR-7.</b>	<b>88</b>
Luchuk V.F., Markov I.S., Schukin I.S.	<b>Diagnosing of electric machines by the WDI-05, TIDI-02, BDI-03 devices</b>	<b>89</b>
Melnic Ja. V.	<b>Vacuum switches of VR series. Features of construction and results of their testing in Science Research Center of High Voltage Apparatus, Moscow.</b>	<b>90</b>