

# Abstracts

## Electrical Mashines and Apparatus

- Gavrilyuk R.B.*  
**Conservation of excitation harmonics in symmetric polyphase winding circuits.**  
Relations between numbers of conductors in all the coils of a winding circuit, winding coefficients of excitation harmonics, slot leakage and differential scattering are analyzed.  
*Key words* – **polyphase winding circuit, excitation harmonics, winding coefficients, relations.**
- Zablodskiy N.N., Filatov M.A., Kvasov V.A., Lupanov A.V.*  
**Experimental research into harmonic spectrum of a multifunctional submersible electromechanical energy converter.**  
Results of experimental research are given, voltage spectrograms are obtained under different operation conditions, the mechanism of higher harmonic generation in a multifunctional submersible electromechanical energy converter is revealed.  
*Key words* – **electro- thermo- mechanical converter, voltage spectrograms, higher harmonic generation mechanism, experimental research.**
- Zinchenko E.E., Finkelshein V.B.*  
**A technique of magnetization curve approximation for switched reluctance motors.**  
The paper presents a technique of magnetization curves approximation for switched reluctance motors and determination of magnetic linkage versus current and rotation angle of the rotor on the basis of MathCAD-2001 spline approximation and spline interpolation. The dependence is used for mathematical formulation of processes in switched reluctance motors and calculation of their parameters and characteristics.  
*Key words* – **switched reluctance motor, magnetization curves approximation, MathCAD-2001 based technique.**
- Luschik V.D., Kirjanov V.V.*  
**Induction motors for mine conveyors with advanced startability.**  
A new way of improving starting characteristics is described by the example of a mine conveyor motor.  
*Key words* – **mine conveyor motor, starting characteristics, improvement.**
- 5 *Milykh V.I., Ivanenko V.N., Grechko N.V.* 20  
**Mathematical simulation of valve inductor generator operating conditions.**  
A mathematical model of a valve inductor generator with overlapped excitation and armature windings is considered, the generator operating under valve load of active type and with auxiliary diodes in the armature winding phases.  
*Key words* – **valve-inductor generator, overlapped windings, mathematical model.**
- Pavlenko T.P.* 25  
9 **Physical processes on contact surface subject to plasma streams and thermionic material activity.**  
Physical processes on the effective contact area and in the interior of the whole composition have a significant effect on operation of the entire contact system. Analysis of the processes interaction adjusted for the contact composition properties has always been topical. The paper deals with a problem of plasma streams interaction subject to thermal emissivity of the contact material.  
*Key words* – **contact area, physical processes, plasma streams, thermal emissivity.**
- Shavyolkin A.A.* 28  
13 **Improvement of cascade multilevel frequency converter characteristics.**  
A feasibility of providing high-quality output voltage and input current for cascade multilevel frequency converters under minimum inverter-unit switching losses is studied. A selective formation of inverter voltage under minimum inverter switching and inverter voltage fundamental harmonic shift in the converter phase is suggested.  
*Key words* – **cascade multilevel frequency converter, minimum inverter switching losses, inverter voltage selective formation.**
- Shynkarenko V.F., Avgustynovych A.A., Lysak V.V., Vachnovetskaya M.A.* 33  
17 **Structural isomery and its modelling in problems of electromechanical structures genetic synthesis.**  
The definition of structural isomery is given. Relation between structural isomery and genetic principle of electromagnetic chromosomes replication is validated. A structural isomers synthesis method based on sequential genetic and geometrical transformations is developed.  
*Key words* – **structural isomery, genetic principle of replication, electromagnetic chromosomes, prediction function of systematic.**

Zhemerov G.G., Kolesnik V.Ju.

### **A refined thyristor model for valve inverter simulation in Matlab 7.0.**

In the article, a refined model of a gate-controlled thyristor is considered for Matlab 7.0. The introduced model, unlike the one presented in Simulink library, takes into account presence of the thyristor recovered charge. By the example of a

37 six-pulse controlled rectifier model, influence of the recovered charge on the magnitude of repetitive voltage surge on the thyristor is shown. A repetitive overvoltage protection circuit calculation algorithm is given.

*Key words* – **refined thyristor model, recovered charge, repetitive overvoltage protection, Matlab 7.0.**

## High Electrical and Magnetic Field Engineering

Baranov M.I.

### **Breakthrough impulse material processing technologies: history, basic physics and technical feasibilities.**

The paper touches on short history of origin and development, in Ukraine and abroad, of such basic impulse technologies of solid, liquid and gaseous materials processing as an explosive, electrohydraulic, magnetic-pulse, electroerosion, integrated high-voltage electromagnetic, wideband electromagnetic therapeutic, cavitation, and corona-ozone ones. The basic physics, specificity, and technical feasibilities of each of the above-mentioned breakthrough technologies are given.

*Key words* – **breakthrough impulse technologies, material processing, short history.**

Baranov M.I.

### **Application of new gas-discharge and solid-state semiconductor switchboards in high-current circuits of powerful high-voltage electrophysical installations.**

The paper reviews the main recent foreign studies in the field of development and creation of a new generation of powerful switchboards used in high-current discharge circuits of high-voltage electrophysical installations with capacitive energy storage for scientific and technological applications.

*Key words* – **gas-discharge and solid-state semiconductor switchboards, high-voltage electrophysical installations, recent foreign studies review.**

42

Batygin Yu.V., Serikov G.S., Bondarenko A.Yu.

### **An induction inductor system of rectangular geometry.**

Results of experimental research on induction inductor systems of rectangular geometry are presented. It is shown that, unlike a cylindrical induction system, a rectangular-shape double coil allows achieving essentially higher degree of evenness in spatial distribution of eddy currents and excited forces of electrodynamic attraction in the working zone.

*Key words* – **induction inductor system, rectangular-shape double coil, experimental research.**

Petkov A.A.

55

### **Statistical characteristics of current pulse rise time distribution in a high-voltage test device.**

In the work, expressions for determination of expectation and dispersion of a current test pulse rise time are introduced. Their application to a test device reliability probability estimation is shown.

*Key words* – **current pulse, digit circuits, test device, rise time distribution, statistical characteristics.**

59

62