

Abstracts

ELECTROENGINEERING: Prominent events and great names

Baranov M.I.

Electrons and Earth civilization.

The fundamental role of elementary electric charge carriers, electrons, in formation and devel-

- 3 opment of Earth civilization is shown from scientific and technical and historical points of view.

Key words – elementary electric charge, electron, Earth civilization.

Electrical Mashines and Apparatus

Baida E.I.

Mathematical modeling of electromechanical systems.

The paper considers a problem of mathematical modeling of complicated electromechanical systems with current computer programs. As an example, a mathematical model of an induction dynamic mechanism without a magnetic core and with a ferromagnetic core is analyzed. Quantitative and qualitative estimations of obtained results are given.

Key words – complicated electromechanical systems, mathematical modeling, current computer programs, quantitative and qualitative estimations.

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

Experimental and theoretical research on an impact inductive electric motor with various inductors.

Experimental and theoretical research on six different impact inductive electric motor inductors excited by a polar capacitive storage is conducted. Mechanisms of the inductor main parameters influence on electrical, mechanical and thermal characteristics at various operating motor modes are revealed. The inductor efficiency work rating is performed. Experiment results and mathematical model numerical solutions are compared.

Key words – inductive electric motor, inductor, current density, projectile velocity.

Kohanovsky V.O.

Research on electric erosion resistance of contact points with enhanced environmental safety.

Results of research into electric erosion of the contact material environmental safety of which is enhanced due to excluding toxic cadmium oxide

- 13 from standard contact material are given. Electric erosion resistance of the developed contacts is 1.6 times as high compared with KMK-A10m-type contacts.

Key words – electric erosion resistance, contact points, enhanced environmental safety.

Milykh V.I., Maistrenko A.M.

A three-phase asynchronous motor mathematical model for a virtual research bench and its practical realization.

A three-phase asynchronous motor mathematical model and its realization algorithm for a virtual research bench have been considered. A principal schematic and graphical model of the research bench is shown, performance characteristic of the motor placed in the virtual laboratory has been obtained.

Key words – virtual reality, virtual reality hardware, electric machine, asynchronous motor, mathematical model, virtual laboratory, virtual reality toolkit.

Shulzhenko N.G., Pantelyat M.G., Rudenko E.K., Saphonov A.N.

Calculation of 3D stationary magnetic fields by finite element method.

A method for finite element analysis of stationary 3D magnetic fields in turbogenerators and other electrical engineering equipment is described. Results of test problems solution are analyzed, credibility of numerical results for particular cases is considered. Results of calculation of stationary magnetic field spatial distribution on different finite element meshes for simplified schemes of a synchronous turbogenerator rotor are presented.

Key words – stationary 3D electromagnetic fields, electrical machines, finite element method

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Electrical Engineering: Theory

Shinkarenko V.F., Zagirnyak M.V., Shvedchikova I.A.

Macrogenetic analysis and rank structure of magnetic separators systematics.

Species diversity of magnetic separators functional class has been systemized. Quantitative composition and genetic information of implicit species forming innovation potential of the ana-

lyzed class have been determined. Rank structure of the basic systematic units has been proposed. Possibilities of practical application of obtained results have been demonstrated.

Key words – systematics, genetic code, generating structure, primary field source, rank structure, basic species.

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Baranov M.I.

Estimation of electroerosive wear of massive homogeneous metallic electrodes of high-voltage heavy-current spark air switchboards of atmospheric pressure.

Results of approximate calculated quantitative estimation of material mass ejected for one spark and specific electric wear are obtained for massive steel electrodes-anodes of high-voltage spark air switchboards of atmospheric pressure under action of heavy pulse decaying sine-wave currents of microsecond time span.

Keywords – heavy-current high-voltage spark air switchboards, massive steel electrodes-anodes, electroerosive wear.

Boyko N.I., Evdoshenko L.S., Zarochetsev A.I., Ivanov V.M.

Development of Conceptions on Trigratron Operation Mechanisms and Their Rational Design.

In the paper, on the basis of results of literature analysis, development of conceptions about trigratron breakdown mechanisms is shown. Special attention is devoted to trigratron breakdown delay time t_3 and its spread Δt_3 .

Key words – trigratron, operation mechanism, operation-delay time, operation time spread, control pulse, parallel connection of trigratrons.

Bondina N.N., Mikhailov V.M.

Approximation of pulse conductance of a thin solenoid – external conducting shell system.

An approximate formula is derived to calculate pulse conductance of a thin solenoid – external conducting shell system. The approximation is

44 based on the assumption that current distribution across the thickness of the shell is uniform. Evaluation of the approximation errors is made in terms of analysis and calculations.

Key words – solenoid – external conducting shell system, pulse conductance.

Gnatov A.V.

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Calculation of electromagnetic processes in an induction inductor system with a massive screen of finite thickness.

The article is dedicated to calculating the main characteristics of an induction inductor system of rectangular geometry with a non-ferromagnetic massive screen and a sheet work-piece for a low-frequency regime. Some analytical dependencies for induced currents and electrical dynamical forces excited as attracting as repelling ones are obtained. A quality analysis shows the integral action of the attracting forces during time has a cumulative character, while the repelling forces integral action aspires to zero.

Key words – induction inductor system, massive screen of finite thickness, non-ferromagnetic sheet thin-walled work-piece.

Petkov A.A.

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Formation of a test voltage impulse on capacitive load.

In the work, formation of a test voltage impulse on capacitive load with utilization of a formative two-terminal device is considered. Materials for selection of the formative two-terminal device structure and its elements values are presented.

Key words – digit circuits, test device, voltage pulse, structure.

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Electric Transport

Lubarsky B.G., Ryabov E.S., Overianova L.V., Emeljanov V.L.

A simulation model of a traction valve inductor electric drive.

The paper presents a simulation model of a traction valve inductor electric drive that allows for geometric parameters of the inductor motor and its power supply and control system.

Key words – traction valve inductor electric drive, geometric parameters, simulation model.

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