

Abstracts

ELECTROENGINEERING: Prominent events and great names

Baranov M.I.

Radio electronics: short history of its formation as the thematic applied-physics field of both electricity and scientific-and-technological advance of the humanity.

The paper presents a brief review of the basic achievements of the humanity in the field of generation, transmission, reception and

5 amplification of high-frequency electromagnetic vibrations in micrometer-meter ranges of wavelengths related to such an advanced branch of science and technology as radio electronics.

Key words – **radio electronics, high-frequency electromagnetic vibrations, radio wave, generation, transmission, reception, amplification.**

Electrical Mashines and Apparatus

Boyko A.St., Zavgorodny V.D.

The basic principles of design calculation of limited angle induction sensors with a transverse-type magnetic system.

A design study technique for limited angle induction sensors with a transverse magnetic system is introduced. The technique allows specifying geometrical dimensions of the active part, the structure of windings and their winding data depending on preset values of external sensor parameters. The technique is confirmed by results of experimental research or output data of the sensor.

Key words – **limited angle sensor, transverse magnetic system, design study, angle code determination.**

Zinchenko E.E., Finkelshtein V.B.

Determination of geometrical dimensions for the magnet core of a switched reluctance motor.

A geometrical dimensions calculation technique for the stator and rotor of a switched reluctance motor is introduced. The technique ensures maximum magnetic field energy in the air gap at a specified current density.

Key words – **switched reluctance motor, magnet core, geometrical dimensions, calculation technique.**

Kuznetsov B.I., Vasilets T. E., Varfolomeyev A. A.

Synthesis and investigation of dynamic characteristics of a light-armored vehicle armament guidance and stabilization neuro-system under stochastic disturbances.

Synthesis and investigation of dynamic characteristics of a neural-network-based guidance and stabilization system for light-armored vehicle armament under external stochastic disturbances are performed. The schematic of a control object model adjusted for external disturbances is developed, a neuro-controller synthesized, the system simulation made. The neuro-system introduced is shown to have one of the basic characteristics of such systems, namely, it is insensitive to external disturbances.

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

Limonov L.G.

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Compensation of dynamic moment of the asynchronous drive of a strip winder.

The article considers questions of improving quality of strip tension regulation by a reel drive with application of an asynchronous motor via compensation of dynamic moment of the electric drive during operation.

Key words – **asynchronous motor, strip winder, dynamic moment.**

Radimov I.N., Rimsha V.V., Chan Txi Txu Huong, Procina Z.P.

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Geometrical proportions in a brushless DC motor

Minimization of the cogging torque in a brushless DC motor through choice of rational geometrical proportions of its active zone is described.

Key words – **brushless DC motor, cogging torque, magnetic field.**

Fomin V.I.

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Quartz filler action on arc quenching in fuses.

The article shows voltage gradient effect in arc column as function of composition and degree of compaction of quartz filler in fuses. Filler loading techniques are reviewed and analyzed.

Key words – **fuse, quartz filler, voltage gradient effect, arc quenching.**

Shumilov Yu.A., Demidyuk B.M., Shtorgin A.V.

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Results of experimental research on THUkr nuclear power station power plant № 3 turbogenerator TVV-1000-2U3 vibrations.

Using a vibrodiagnostics technique, reasons for failure of turbogenerator (TG) TVV-1000-2U3 stator winding in THUkr nuclear power station power plant № 3 are analyzed. The existing vibration control techniques oriented towards offset of the TG construction elements from frequencies of 50 and 100 Hz are shown not to meet the real situation as vibrations at the frequencies multiple of 50 and 100 Hz play a noticeable role in increased vibroactivity of the TG stator winding. Along with harmonic components (higher ones and subharmonics), a significant role is played by the vibration noise component caused by the stator core insufficient pressing.

Key words – **turbogenerator failure, vibrodiagnostics technique, experimental research.**

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Baida E.I.

Electromagnetic equations based calculation of transients in an electromechanical mechanism.

A mathematical model for calculation of transients in an electromechanical mechanism with electromagnetic field theory application is developed in Femlab. Magnetic flux and eddy currents distribution in the magnetic core in transient modes is obtained. Conclusions concerning feasible speed of the electromechanical mechanism are made.

Key words – electromechanical mechanism, electromagnetic field theory, transients calculation, Femlab.

Baranov M.I.

Research on stochastic distribution of de Broglie half-waves and wave packages in a conductor with a high-density pulse current.

On the basis of analytical and experimental

39 data, it is shown that longitudinal distribution of quantized lengths of de Broglie half-waves and macroscopic electron packages in a thin round galvanized steel conductor with axial aperiodic conduction current at the peak density of $0,37 \text{ kA/mm}^2$ has probabilistic nature specified by quantum-mechanical mechanisms of free electrons behavior revealed by the author.

Key words – metallic explorer, current of conductivity, electronic waves, electronic wave packages.

Chaban V.

Co-energy of electromagnetic field.

The paper shows that in an electromagnetic field the kinetic energy and co-energy that satisfy the principle of least action in the variation integral Hamilton-Ostrogradsky's principle ensure equal force characteristics of the last.

Key words – isotropy medium, energy and co-energy, electromagnetic field.

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High Electrical and Magnetic Field Engineering

Batygin Yu. V., Chaplygin E. A.

Experimental investigation of eddy currents excitation in flat sheet metals.

A direct measurement technique for induced currents in flat sheet billets of inductor systems for magnetic impulse metalworking is introduced and described. Experiments conducted have verified theoretical conclusions about change in induced signals time function as compared with inductor current at lower working frequencies of acting fields. For a harmonic process, the phase deference between an excitation signal and an induced one is $\sim \pi/2$.

Key words – flat sheet metals, eddy currents excitation, experimental investigation, direct measurement technique.

Besprozvannykh A.V., Naboka B.G.

Action of energy dissipation in near-surface layers of cable cord insulation on dielectric losses in cables.

Substances formed at cable operation are deposited on the surface of isolated cords. They are harbingers of the isolation ageing. Revealing near-surface layers is possible through results of dielectric dissipation factor measurements. However, the protective polyvinylchloride jacket significantly influences measurement results. Energy dissipation in the near-surface layers can be revealed via the tangential component of an electric field. Difference in $tg\delta$ is an order at the frequency of 10 kHz under realization of complex examination circuits with the tangential component of a probing field. It is evidence of non-uniform distribution of surface layers in the cable cross-section.

Key words – insulation, near-surface layers, energy dissipation, dielectric dissipation factor, tangential component of an electric field.

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

A Compact Multi-Module Generator of 2 MA Current Pulses.

A compact 32-module pulse generator with the total load current output of about 2 MA has been

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created. A mechanism of synchronous switching-on of air (under atmospheric pressure) trigatrons of the modules in the conditions when the two main electrodes have no galvanic coupling to the ground is described. A module trigatron adjustment procedure for parallel operation is given.

Key words – air trigatron, synchronous switching-on of trigatrons, compact multi-module current pulse generator.

Bondarenko A.Yu.

Capacity discharge on a plane single-turn inductor located over a thin-walled sheet work-piece.

Theoretical analysis of the transient phenomenon in the discharge circuit of a capacitive energy storage loaded with a single-turn inductor located over a thin-walled work-piece has been carried out. Electromagnetic field penetration in the work-piece has been taken into account. The transient phenomenon is shown not to influence substantially on the integral form of the discharge current.

Key words – transient phenomenon, single-turn inductor, discharge current, thin-walled work-piece.

Serikov G.S.

Magnetic field and pressure excited by an inductor with finite-width current distributors in workpiece bends.

In the article, influence of current-distributors cross dimensions on magnetic pressure value in a metal sheet bend is theoretically analyzed. It is shown that combining inclination of the plane in which the current distributors are located with the width of the "far" current distributor allows reaching sufficiently-high level of the field and magnetic pressure forces concentration in the working zone.

Key words – finite-width current distributors, metal sheet bend, magnetic field, magnetic pressure, analysis.

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