

Abstracts

ELECTRO ENGINEERING: 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 amplification

5 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

Bezotosniy V.F., Vlasenko EV, .Kozlov V.V., Afanaseva I.O., Nabokova O.V., Emeljanov V.L.

Some actual directions of nondestructive control of material properties by electromagnetic methods.

Problems of control of non-electrical and electrical parameters of materials by electromagnetic methods are considered in this article. An automated nondestructive control system for mechanical stresses in electronics elements is introduced.

Key words – **control of non-electrical parameters, nondestructive control, mechanical stresses.**

Grechko A.M.

Dynamic characteristics of an electromagnet with a single-position magnetic latch.

Dynamic characteristics of an electromagnetic drive with a single-position magnetic latch for medium-voltage vacuum circuit breaker are studied.

Key words – **electromagnetic drive, single-position magnetic latch, dynamic characteristics.**

Zhemerov G.G., Kolesnik V.J.

Analysis of processes in an active rectifier - current source in asynchronous machines starting system.

Application of an active rectifier - current source in the starting system of asynchronous machines on the basis of a current source inverter is considered in the article. Expressions for determination of voltages and currents in the network filter of the active rectifier – current source elements are obtained. Output voltage waveform of the active rectifier is analyzed.

Key words – **active rectifier - current source, current source inverter, network filter.**

Klymenko B.V.

Electrical and magnetic devices: terminology of International Electrical Dictionary.

The paper considers a number of problems concerning introduction of terms and definitions from International Electrical Dictionary (IED). We

10 begin publishing a nonofficial translation of an IED part, namely, *part 151 - Electrical and magnetic devices*, with the author's comments and explanations.

Key words – **International Electrical Dictionary terminology introduction, nonofficial translation.**

Makogon S.A.

Simulation of unidirectional magnetic forces in a coaxial-linear synchronous vibrator with an asymmetrically positioned armature.

Unidirectional magnetic forces and traction characteristics for a coaxial-linear synchronous vibrator with a toothed and toothless stator are analysed by a finite element method.

Key words – **FEM, linear vibrator, magnetic forces.**

Milykh V.I., Tkachenko S.V.

Force interactions in a linear electric motor for seismic vibrations sources.

Force interactions in a linear pulse electrodynamic motor for sources of seismic vibrations are considered. The motor differs in its cylindrical electromagnetic system and its strong magnetic saturation. Contribution of electrodynamic and magnetic constituents to the total traction force is revealed. Force behavior as function of the relative position of the armature and the reactor as well as mmf of their windings is specified.

Key words – **pulse electrodynamic electric motor, seismic vibrations, force interactions.**

Radimov I.N., Guliy M.V., Rimsha V.V., Tran Thi Thu Huong

Parameters of a brushless DC motor with permanent magnets.

Calculation and identification of parameters of a brushless DC motor with permanent magnets are presented.

Key words – **brushless DC motor, magnetic field, parameters, inductance.**

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Getman A.V.

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Kanov L.N.

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Universal selected contours of a measuring system of varied space harmonics of a magnetic field.

The practical aspects of a spatial harmonic analysis are investigated with the purpose of approach to a surface technical objects of area, accessible to analytical description of an exterior magnetic field. The spatial configuration of systems contours of measuring spherical and spheroid harmonics of a magnetic field is theoretically justified. The procedure of application contour measuring systems for definition amplitude coefficients of varied harmonics of scalar magnetic potential is extended.

Key words – magnetic field, spatial harmonics, magnetic potential, spherical harmonic analysis.

Construction and feature study of ferroresonant circuits on the basis of a circuit modeling method.

Circuit models of the main single-line and nonlinear electrical elements in the stationary mode of alternating current are introduced, the models utilized to obtain a circuit model of a ferroresonant circuit. A technique for constructing the circuit voltage-current and amplitude-frequency characteristics as well as specifying limits of stable modes is developed.

Key words – resistance, inductance, operated source, voltage-current and amplitude-frequency characteristics, circuit model, slowly changing amplitudes, stability.

High Electrical and Magnetic Field Engineering

Baranov M.I.

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Key words – experimental investigations, inductor systems, angled bend forming, sheet work-pieces.

A ball lightning, a powerful natural molecular integrator of atmospheric electricity. A new hypothesis of the origin and a theory of the electrophysical phenomenon.

A new physical and mathematical model and a new hypothesis of a probable origin, formation and existence in the air atmosphere of such a natural phenomenon as a ball lightning (BL) are introduced, based on electric dipoles of water microparticles (molecules) and their electrostatic coupling with the negatively charged nucleus of lightning. Analytical estimations of possible levels of the strength of ultrahigh electric field inside and outside of the BL active spherical zone, as well as electric potentials, density, and absolute indices of electric energy accumulated by BL are executed.

Key words – ball lightning, physical and mathematical model, origin, formation and existence, analytical estimations.

Batygin Yu.V., Bizhar Magid, Serikov G.S.

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Key words – induction inductor system, inductor, auxiliary screen, work instrument.

Experimental investigation of inductor systems for angled bend forming on sheet work-pieces.

Conducted experimental investigations of inductor systems for angled bend forming on sheet work-pieces has confirmed theoretical results reliability and, correspondingly, practical workability of inductor system designs developed for performing the given technological operation. Allowance for finite lateral size has shown that the real width of current-conductors essentially decreases magnitudes of excited fields and pressures. Thus, changing a point model to a strip one gives decreasing the magnetic field intensity by maximum ~ 33% and pressures ~ 89%.

Batygin Yu.V., Chaplygin E.A., Chernogor T.T.

Experiments with induction inductor systems for magnetic pulse attraction of sheet metals.

In the present work, a constructive solution for increasing magnetic pulse attraction efficiency in induction inductor systems is suggested. The technical essence of the suggestion consists in specifying a geometrical shape of an additional screen what permits decreasing a distance between interacting subjects. Testing an experimental model has shown its practical workability.

Key words – induction inductor system, inductor, auxiliary screen, work instrument.

Petkov A.A.

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Calculations of tolerance of high-voltage test device digit circuits.

In the work, selection of tolerance of test device digit circuit's elements under known tolerance for controllable parameters of a current pulse is considered. Relationships are presented, a tolerance calculation technique introduced.

Key words – pulse, digit circuits, tolerance, test device, controlled parameters.