

ABSTRACTS

Theoretical electrical engineering and electrophysics

SHIDLOVSKA N.A., SAMOILENKO V.G., KRAVCHENKO O.P., KUCHERJAVA I.M. (Kyiv) **The comparative analysis of analytical and numeral methods of computation of processes in a nonlinear electric circuit**

The comparative analysis of computations of the processes in a nonlinear discharge circuit made by means of an analytical and a numeral method is conducted. Efficiency of application of the proposed analytical method for solution of the corresponding problems of electrical engineering is proved.

BARANOV M.I. (Kharkiv) **Wave radial distribution of free electrons in a cylindrical conductor with an alternating electric current**

A design quantum mechanical estimation of a radial distribution of free electrons drifting in a longitudinal direction of a conductor with an electric conduction current of different amplitude-to-time parameters in a round metallic conductor is given on the basis of wave mechanics regulations. It is shown that a whole quantized number of electronic half-waves of de Broglie with an amplitude decreasing from the center to a periphery is packed up at an outer radius of a cross section of the conductor being investigated.

Electromechanical energy conversion

VOLKOV A.V., KOSENKO I.A. (Zaporozhje) **Analysis of electromagnetic processes of an asynchronous motor at supply from an autonomous current inverter with pulse-duration modulation**

Analytical rated dependences of algebraic form are obtained by means of summarized vectors methods and operator representation. Computation and analysis of stationary electromagnetic processes of an asynchronous motor at supply from an autonomous current inverter with pulse-duration modulation are made by means of these dependences.

ORLOVSKY I.A. (Zaporozhje) **Computation of models of nonlinear electromechanical objects at polynomial recurrent neural networks from their known mathematical models**

Structures are developed and general rated dependences for weighting factors of polynomial recurrent neuron networks (PRNN) intended for presentation of the models of these objects are obtained on the basis of the known mathematical models of nonlinear objects. Methods of the models development at PRNN are given and their computation and research by the method of imitation simulation is executed for a thyristor electric drive with a motor of direct current of series excitation are made.

LESNIK V.A., MAZURENKO L.I., FEDORENKO G.M. (Kyiv) **Research of non-synchronous switching on of generators into a network**

A mathematical model and results of investigation of non-synchronous switching on of a synchronous generator into a network is presented. Recommendations which are to be observed at a non-synchronous switching on of a generator are given.

Electric power systems and installations

ZORIN V.V. (Kyiv), BURBELO M.Y., VOLOTSKY A.M. (Vinnitsa) **Estimation of interference of static characteristics of loads center and optimal decisions of mathematical models of asymmetry reduction and voltage deviations**

Interferences of optimal decisions of the tasks of asymmetry reduction, voltage deviations and static characteristics of loads center at introduction of multifunction correctors are analyzed.

BOIKO N.I., EVDOSHENKO L.S., ZAROCHENTSEV A.I., IVANOV V.M. (Kharkiv) **Trigatrons with operating voltage up to 1 MV with nanosecond operating time**

4-channel trigatron with 400 kV voltage and switching current up to 280 kA, in which lag time of disruption $t_3 \approx 1$ ns and its spread $\Delta t_3 < 1$ ns, is proposed. Special features of the proposed trigatron are the following: placing of a controller in a high-voltage main electrode of positive polarity, with this a managing impulse has also positive polarity, and presence of a metal protective screen in a discharge chamber of a trigatron. The requirements to trigatrons with up to 1 MV voltage with nanosecond operating time are worked out.

PENTEGOV I.V., RYMAR S.V. (Kyiv) **Computation of losses in a magnetic core steel of three-phase reactors at presence of high harmonics of a magnetic flux**

A theory and methods of losses computation in a magnetic core steel of three-phase reactors at presence of high harmonics of a magnetic flux, which take into account special features of different influence on losses from eddy currents and on hysteresis of harmonic components of a magnetic flux flowing in a magnetic core, are created. The method permits to compute and design reactors operating in high harmonics devices.

Electrotechnology

SHIDLOVSKY A.K., SCHERBA A.A., PODOLTSEV A.D., KUCHERJAVAJA I.N. (Kyiv), ZOLOTARJEV V.M. **Induction heating of a segmented lead of a power cable at the stage of its production**

Electromagnetic and thermal processes in a segmented lead (as "Milliken") of super-high-voltage power cable with a large cross-section (section of a lead is more than 1000 mm²) at continuous motion in a variable magnetic field of cylindrical inductors are investigated in the work. Special features of a surface effect and a proximity effect in isolated segments of a lead in the range of 50-2400 Hz frequency change are considered. Regularities of temperature distribution in a segmented lead and terms of its heating up to the predetermined temperature of 80-120°C are analyzed.

FIKSEN V.N., DUBODELOV V.I., GLUKHENKY A.I., GORISLAVETS Yu.M. (Kyiv) **MHD agitators of aluminum alloys with a pulsating magnetic field**

A computer simulation of electromagnetic and hydrodynamic processes at liquid metal mixing by pulsating magnetic fields is made with reference to reverberatory furnaces for melting and preparation of aluminum alloys. A comparative analysis of constructions of electromagnetic agitators with pulsating and traveling magnetic fields is made.

RUDENKO Yu.V. (Kyiv) **Control characteristics of a sectionalized power supply source for electron-beam technologies**

Simulation of electromagnetic processes in a high-voltage sectionalized power supply source for electron-beam technologies is made. Control characteristics of a source depending on internal parameters of a power transformer are determined.

KOMAROV N.S. (Kyiv) **Power supply devices of capacitive arc heaters for installations of wastes gasification**

Structures of power supply devices of arc heaters of constant current (plasma generators) of 0,5—1 MW, used in gasification installations for peat, shale, lignite, industrial wastes and domestic garbage processing, are considered. A prospect structure is based and estimation of the main indices of an electric supply device is made.

KHALIKOV V.A., LYPKIVSKY K.O., SHATAN O.F. (Kyiv) **Ways and methods of improvement of electric arc welding plants**

Ways and methods of improvement of electric arc welding plants and their functioning due to the processes simulation, use of microprocessors, etc., are considered.