# ABSTRACTS

**Theoretical electrical engineering and electrophysics**

SHIDLOVSKY A.K. , SCHERBA A.A., PERETJATKO Yu.V. (Kyiv), ZOLOTARJEV V.M. (Kharkiv) **Analysis of microinhomogeneity of an electric field as a factor intensity increase of threshold electrophysical processes in a polymeric insulation of high-voltage cables and self-carrying insulated wires**

The mathematical model has been developed and numerical computation for distribution of low-frequency electrical field in polyethylene insulation of high-voltage cable-conductor manufactures has been carried out. This computation has taken into consideration a different assemblages of closely located micro-inclusions (both surface and volumetric micro-inclusions as well as air and water ones). The analysis of conditions for initiation of threshold electro-physical processes in local volumes of polyethylene insulation has been performed.

SHYDLOVSKA N.A. (Kyiv), VARENIK E.A., DZJUBAN V.S. (Donetsk), SHKRABETS F.P. (Dnipropetrovsk) **Analysis of processes in a protective circuit from leakage currents considering nonlinearity of a flux linkage** Processes in a protective circuit from leakage currents considering nonlinearity of a flux linkage in inductance with a ferromagnetic core are analysed. Necessity of taking into acoount of the above-mentioned nonlinearity is proved on the basis of the obtained correlations.

PETUKHOV I.S. (Kyiv) **Simulation of a variable electromagnetic field in a ferromagnetic conducting environment by the finite elements method** A method of a variable electromagnetic field simulation in an electrically conducting ferromagnetic environment, taking into account a nonsinusoidal in time character of this field, is elaborated. Deviations in the results of computation of an integral heat generation and impedance as compared to a software package FemLab and Neumann formulas are computed.

SUPRUNOVSKAYA N.I. (Kyiv) **Power characteristics at initial conditions change of an oscillating charge of a capacitor from a direct voltage source** Analysis of dependence of power characteristics of an oscillating charge of a capacitor from a direct voltage source from changeable initial voltages at a capacitor and good quality of contour is made. The most energy-wise expedient modes of a capacitor charge are determined. It is shown that increase of both initial voltage at a capacitor and good quality of a contour results in increase of a charge efficiency. It is also shown that increase of an absolute value of a negative initial voltage together with increase of good quality of a contour results in voltage increase of a capacitor charge. A charge modes, at which energy loss reduces in 3,2 and more times, whereas a dose of energy, coming through a capacitor, reduces only in 1,26 times, and a charge voltage of a capacitor increases in 1,3 and more times. The modes of high capacity obtaining of a charge at mean power stabilization, consuming from a direct voltage source, are also determined.

**Conversion of electric energy parameters**

VOLKOV I.V., PODOL'NY S.V. (Kyiv) **Relatively-continuous gain-frequency characteristic of an inverter voltage in the problem of a parameter optimization of power SIN- filters** A generalized gain-frequency characteristic of maximums, which gives a possibility to simplify a process of parameters optimization of output sin-filters AC-DC-AC of energy conversion systems, is proposed.

LYPKIVSKY K.O. (Kyiv) **Special features of computation of single sectionalized autotransformers with different operation modes** Possibility of a design value decrease of an installed capacity of a sectionalized autotransformer, operating in different modes, due to the account of irregularity of current load of separate sections in an operation process, is considered.

**Electromechanical energy conversion**

SHYDLOVSKY A.K., PAVLOV V.B., POPOV A.V. (Kyiv) **Application of supercondensers in an autonomous storage battery electric transport**

Different aspects of supercondensers application in electric vehicles and other vehicles with autonomous power supplies are analysed. Positive and negative properties of supercondensers are shown, directions of further researches are determined.

ANTONOV A.E., KIREJEV V.G. (Kyiv) **Simulation of multipole magnetic systems of magnetoelectric engines taking into account interpole extraneous fields** Simulation of multipole magnetic systems of slotless electromechanical energy converters is conducted. Optimum poles and geometric correlations between the elements of these systems, providing the highest efficiency of an electromechanical converter, are determined.

SOLOVEY V.V., FEDORENKO G.M., ZEVIN L.I., KENSYTSKY O.G., OSTAPCHUK L.B., DUBIK G.O., (Kyiv) **Increase of power efficiency of powerful turbo-generators with hydrogen cooling systems** The article is devoted to increase of power efficiency, reliability and fire safety of powerful turbo-generators with hydrogen cooling systems.

A new technology which can be offered for hydrogen clearing and dehydration in gas systems of turbo-generators, namely the technology on the basis of metal hydrides application, is considered. It permits to accumulate hydrogen in a gaseous state, save it safely and give it to users with the set indices of pressure and expenses. The results of computations of total losses of turbo-generators of ТГВ-200 and ТВВ-100-2У3 are given. Use of modern hydrogen technologies permits to increase cooling intensity and decrease mechanical losses of turbo-generators.

**Electric power systems and installations**

MARCHENKO N.B., MYSLOVICH M.V. (Kyiv) **Simulation of diagnostic signals of electric power equipment by means of linear random processes with discrete time within the framework of a power theory**

A problem of a simulation method substantiation of different diagnostic signals of electric power equipment by means of mathematical models of linear random processes with discrete time is considered. Properties of the most typical forms of such processes, which are more known as the processes like white noise, are described and considered. Results of simulation of wavelength-correlation characteristics of diagnostic signals of electric power equipment with white noise application with a discrete time are given.

ROSEN V.P. (Kyiv), VOLYNETS V.I. (Lutsk) **Factor analysis of efficiency of electric energy consumption of coal mines** Selection of factors, which influence efficiency of electric energy consumption of coal mines of Lvivsko-Volynsky region the most, is made by means of expert-statistical methods, and the structure of this influence is also determined.

RJABENKY V.M., DJAKONOV A.S. (Mykolajiv) **Investigation of frequency characteristics of a high-voltage potential divider at different location of a low-voltage arm** An equivalent circuit of a high-voltage damped potential divider with different locations of a low-voltage arm is considered. It is shown that linearity of a gain-frequency characteristic in a high-frequency range can be improved by location of a low-voltage arm in the middle of a divider. An electro-optical method of high voltage measurement is considered.

**Electrotechnology**

GORISLAVETS Yu.M. (Kyiv) **Electromagnetic field and parameters of a device of continuous fining of liquid metal** Electromagnetic field is computed on the basis of a circuit-field problem solution and electromagnetic parameters of a combined device of liquid metal fining, created on the basis of an induction unit of a smelting furnace and used in the technology of continuous casting of aluminium alloys, are determined.

**Information measuring systems in power engineering**

MIKHAL A.A., SEMENYCHEVA L.N., SURDU M.N. (Kyiv) **A method of non-linearity determination of precision thermometric measuring devices** A method of linearity error determination of precision thermometric measuring means with application of resistance standards, which exactness can be substantially lower than the exactness of a controllable means, is proposed. The results of experimental error estimation of 10-7 and lower are given by the example of two types of measuring devices.