

## Abstracts

### Theoretical electrical engineering and electrophysics

PENTEGOV I.V., VOLKOV I.V., PODOLNY S.V. (Kyiv)

#### Modification of a method of functions synthesis of minimum reactance by Brune

Modification of a method of functions synthesis of minimum reactance/conductivity by the method of Brune is proposed. That allows to obtain additional topology variations of output circuits which efficiency as input/output filters AC-DC-AC-system can be higher comparing with classical implementation.

SCHERBA A.A., PODOLTSEV A.D. (Kyiv), ZOLOTARJEV V.M. (Kharkiv)

#### Pulse current in a polyethylene insulation with pocket air at a partial discharge origin

Pulse processes (with a characteristic time of 10-6 c) of current density distribution in a polyethylene insulation of a power cable at pocket air presence and a partial discharge origin in it are investigated in this work. The results are obtained by means of a numerical solution of the method of final elements of the system of Maxwell differential equations for a heterogeneous dielectric written in a quasi-electrostatic approach. Special features of a pulse current spreading in a dielectric volume are studied. It is shown that only a part of a general current (25-30%) flowing in the volume of pocket air at a partial discharge origin in it is closed through an external circuit and fixed by the devices measuring a level of partial discharges in a cable.

BARANOV M.I., NOSENKO M.A. (Kharkiv)

#### Mathematical simulation of electro-thermal processes in a metal covering of an aircraft at lightning effect

Approximate mathematical models of a two-dimensional temperature field in a reference area of a channel of a lightning electrical discharge influencing a flat wall of a metal covering of an aircraft in ambient air are proposed. It is determined on their basis that at a direct thunderbolt at an aircraft a pulse component of lightning current of a temporal shape 2/50 mcs with a normalized amplitude of 200 kA and duration of 500 mcs causes a local destruction of an aluminum wall of an aircraft covering at a depth up to 0,4 mm because of an electro-thermal effect, and a protracted current component of lightning with the same amplitude and duration of 1000 mc can cause its fusion penetration at a depth up to 1,5 mm.

CHERNYSHEV A.V. (Minsk)

#### About simulation of reversible processes of ferromagnetics magnetization

Comparison of methods of determination of a reversible magnetization component  $J_{rev}$  in the known model by Jiles-Atherton and on the basis of integration of a reversible magnetic susceptibility is made. A question of determination of an internal magnetic field tension in a ferromagnetic is considered. At its changes  $J_{rev}$  changes reversibly in a thermodynamic sense. It is shown that a method of  $J_{rev}$  determination applied in the model by Jiles-Atherton can cause the results which are substantially different from the real ones. The most exact results of  $J_{rev}$  determination can be obtained only on the basis of integration, at a certain interval, of experimentally found dependences of a reversible magnetic susceptibility on an external magnetic field tension.

SIDORETS V.N. (Kyiv)

#### Criteria of the determined chaos in nonlinear circuits with an electric arc

It is shown that complex vibrations arise in nonlinear circuits with an electric arc at definite values of parameters. On the basis of four criteria aggregation (extraordinary sensitivity to the initial conditions, continuous noise-type frequency spectrum, positivity of Ljapunov index, Smale horseshoe) the conclusion is made that difficult vibrations observed in nonlinear circuits with an electric arc are the determined chaos.

#### Conversion of electric energy parameters

LIPKOVSKY K.A., RUDENKO Yu.V. (Kyiv)

#### An output voltage stabilization in a high-voltage divided supply source

A mechanism of an output voltage stabilization in a high-voltage divided power supply source is analyzed. An error and a coefficient of an output voltage stabilization are estimated, practical recommendations on choice of an operating agency structure of a power supply source are given.

#### Electromechanical energy conversion

MARENICH K.M., VASYLET'S S.V. (Donetsk)

#### Substantiation of neutralization efficiency of reverse EMF of engines as a method of operation safety

## **increase of an electrical engineering complex of a mine sector**

Efficiency of neutralization of reverse EMF of users' motors is grounded on the basis of a theoretical analysis of a circuit state of a single-phase ground leak of current at an emergency process in conditions of an electrical engineering complex of a technological mine sector as a method of safety increase.

AKININ K.P. (Kyiv)

## **Concepts and construction principles of electric drives on the basis of contactless magneto-resistor engines**

Tendencies of development, principles and special features of electric drives construction on the basis of contactless magneto-resistor engines are considered. A concept of these electric drives construction is formulated.

GREBENIKOV V.V., KOZYRSKY V.V.,  
PETRENKO A.V. (Kyiv)

## **A cylindrical electro-magnetic machine of an alternate/reciprocal motion**

Analysis and comparison of two types of cylindrical electro-magnetic machines of an alternate/reciprocal motion characterized by the similar overall dimensions of a mobile element are made. It is shown that in a construction, each drive winding of which is surrounded by a closed core, dependence of an effort working on a mobile element has a sine shape, and maximum of an effort has a greater value as compared to a construction with drive windings concentrated in one magnetic core.

ALLAEV K.R. (Tashkent), FEDORENKO G.M.,  
OSTAPCHUK L.B. (Kyiv)

## **Asynchronous turbo-generators in electric power systems**

Results of complex computing-experimental investigations of asynchronous turbo-generator modes in electric power systems are presented. Asynchronous turbo-generators are considered as natural air dampers of long-range and super long power lines.

## **Electric power systems and installations**

STOGNIY B.S., KIRILENKO O.V., PAVLOVSKY  
V.V., LEVKONJUK A.V. (Kyiv)

## **Increase of carrying capacity of "weak" sections of power systems with application of technology of flexible transmission by an alternating current**

Two alternative approaches to increase of carrying capacity of existing connections of power systems sections due to natural power increase of power lines or with the use of FACTS technologies are considered. It is based and confirmed by computations that the most efficient solution of the problem of carrying capacity increase of "short" (up to 300 km) power lines, "overloaded" in natural power, is application of FACTS systems of transversal type. However, measures on natural power increase can be more attractive for power lines-750 kV of the United Power System of Ukraine which mainly have the length greater than 300 km.

KUZNETSOV V.G. (Kyiv), RAMAZANOV K.N.,  
SALIMOVA A.K. (Azerbaijan)

## **Electric energy demand management as a factor of efficiency increase of a power system operation**

Dynamics of irregularity ratio change of a daily load demand of a power system for 2003-2007 is investigated. It is shown that introduction of a differentiated tariff for consumed by areas energy favorably influences adjusting of a load demand of a power system and gives a considerable economic effect.

## **Information measuring systems**

TESIK Yu.F. (Kyiv)

## **A precision calibrator of an alternating voltage on the basis of a method of direct reproduction of a constant voltage source**

A new method of an alternating voltage reproduction, based on application of relaxation circuits of an oscillatory circuit for a direct accuracy transmission from a source of constant voltage to a source of alternating voltage, is considered.