

ABSTRACTS

Theoretical electrical engineering and electrophysics

M.V.ZAGYRNIAK (Kremenchuk), Y.A.BRANSPIZ (Lugansk) **To the estimation of the uniform magnetic field force acting on linear ferromagnetic current-carrying conductor.**

The uniform magnetic field force acting on linear ferromagnetic current-carrying conductor is considered in the article. The field actions having an impact on the ferromagnetic substance of conductor for various models of magnetization such as equivalent-current, fictitious magnetic charge and magnetic moment are determined. It is shown that these models have equal scalar forces with the exception of equivalent-current model having the opposite force. It is also declared that the above inconsistency leaves open the Einstein's issue on measurement of the force having an impact on current of the ferromagnetic substance.

Y.V.BATYGIN, A.Y.BONDARENKO (Kharkiv) **The forces having an impact on thin-walled nonmagnetic conductor in penetrating field of single-turn flat coil.**

The article is dedicated to performance of the theoretical analysis and measurement of force intensity having an impact on sheet nonmagnetic conductor in pulsed magnetic field of single-turn coil on condition that the field penetration into flat conductor metal exceeds the thickness of the latter. The article specifies the oscillation increase of excited electrodynamic forces within pulsed magnetic field action time due to the extension of normal component influence of magnetic intensity at operating frequencies of the order of kiloHerz . It is the reason why electrodynamic force measurement should be performed according to Lorentz force formulas but not the simplified formulas that include only square difference of magnetic-field vector tangent component. The physical loss mechanism of magnetic field force acting on conductor is determined by the extension of normal component influence of magnetic intensity on current electromagnetic processes. The results of force measurement having an impact on sheet conductor for specific inductance-type system are obtained.

A.I.HLUKHENKY, A.A.MYKHAL (Kyiv) **Analysis of circular conductor impedance components within AC measurement.**

The article is dedicated to research of electromagnetic processes within impedance measurement of the circuit conductor part in direct and reverse AC conductors system. For two possible configurations of measuring terminals the connection of electromagnetic field differential parameters with voltage at the terminals for voltmeter connection is shown. The forms for calculation of impedance measured values are given in the article. Analysis of phase angle tangent and resistance measurement error that can occur by switching from alternating to direct current is performed.

A.V. BESPROSVANNYKH (Kharkiv) **High electric field and partial discharges in bundled cables.**

Estimation of partial discharges initial voltage in bundled cables of various structure is performed. For compact structure cables the voltage is measured by field line tracing in air gaps between insulated conductors. For cables with free spaces between their lay-ups, estimation of partial discharges initial voltage is performed according to the field density on conductor insulation surface.

Conversion of electric energy parameters

K.O.LYPKIVSKY, V.A.KHALIKOV, A.H.MOZHAROVSKY (Kyiv) **Analysis of AC voltage parameters conversion in electrotechnical and electrotechnological systems.**

The analysis results of the main aspects of formation of transformer-based operating units of discrete voltage converters obtained within the research activity "PEHAII" ("RENAP") are presented in the article. The peculiarities of operating characteristics of discrete AC voltage regulators are analysed and the new rules of their formation are proposed. Synthetic and design procedures of the most prospect features by removing the key elements from power current circuits are developed and the ways of their improvement are discussed. Voltage regulation systems for optimal volt-ampere characteristics of power sources of electrotechnological equipment are analysed and developed.

A.K.SHYDLOVSKY, N.I.SUPRUNOVSKAJA (Kyiv) **Energy processes in electrical circuits of electric pulse installations with capacitive energy storage at limitation of duration of its discharge on electrospark load at nonzero conditions of the charge.**

The analysis of energy processes in electrical circuits of electric pulse installations with capacitive energy storage at limitation of duration of its discharge on electrospark load with several times increase of its electrical resistance to the moment of discharge termination is performed. The expediency of changeable charge and discharge conditions of capacitors in such installations for increase of their energy characteristics is justified. The behaviour of energy characteristics of electric pulse installations at nonzero starting charge and discharge conditions of a capacitor is determined and the expediency of forced duration decrease of aperiodic discharges of a capacitor on electrospark load is proved.

V.M.MYKHALSKY, V.M.SOBOLEV, V.V.CHOPYK, I.A.SHAPOVAL (Kyiv) **Self-commutated voltage inverters control with maintenance of maximum modulation coefficient by undistorted output voltage generation with the help of modified PWM.**

Selection of steady-state conditions of self-commutated voltage inverter keys for PWM, their sequence and determination of the relative use duration in modulation period for undistorted output voltage generation with maximum coefficient of power-supply voltage application is discussed.

Electromechanical energy conversion

S.M.PERESADA, S.N.KOVASA, V.S.BOVKUNOVYCH (Kyiv) **Robust torque-flux vector control of asynchronous motor.**

The general theoretical solution of indirect torque-flux vector control problem of asynchronous motor is given. The synthetic procedure of indirect vector control algorithm that provides asymptotic tracking of torque-flux reference trajectories, asymptotic decoupling of torque-flux output points control, and robustness properties with respect to rotor resistance variations is developed.

Electric power systems and installations

P.O.CHERNENKO, O.V.MARTYNIUK (Kyiv) **Forecast updating of monthly electric energy consumption of power units.**

The method of forecast updating of monthly electric energy consumption of power units is offered. The forecast updating is performed by the calendar, with regard to the actual electric energy consumption, average monthly temperature variations, short-term temperature forecasts and daily electric power consumption by energy-consuming enterprises.

Electrotechnological complexes and systems

N.A.SHYDLOVSKAYA, V.V.MARTYNOV (Kyiv) **Adjustment of the high-voltage power supply to an electron-beam unit.**

The transients in output circuits of the high-voltage power supply connected by a piece of line to the electron-beam gun are considered in the article. It is shown that the transient processes are influenced by the output circuit parameters of power supply, connection lines and short circuit duration. Measures for rectifier diodes protection and transient processes improvement in power circuits connected to the electron-beam gun are proposed.