

## ABSTRACTS

**Multiphysical model calculation of boundary current welding contact vacuum circuit breakers / E.I. Baida** // Bulletin of NTU "KhPI". Series: Problems and Improvement elektricheski machines and aids. Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 3-9. – Bibliogr.: 7. – ISSN 2079-3944.

A multiphysical model of alteration of the strength bodies' contact area as a function of the contact surface temperature is considered. Mathematical formulation of the problem is described, an example of the welding sustaining current is presented. The developed model is based on the complex calculation by the theory of elasticity and thermal conductivity. A dependence of contact pressures and contact area dimensions as a function of temperature is shown. It is determined that the contact area temperature depends essentially on the temperature of distant points at emergency over-currents. The developed technique can be used to assess and calculate the electrical apparatus thermal resistance.

**Key words:** the vacuum circuit breaker, welding current, the contact area.

**About the operation efficiency increase of high-power shunt reactors / L.B. Zhorniak, V.I. Osinskaia, A.S. Paltsun** // Bulletin of NTU "KhPI". Series: Problems of Electrical Machines and Apparatus Perfection. The Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 10-15. – Bibliogr.: 7. – ISSN 2079-3944.

Ways to increase the voltage quality in energy-intensive customers' networks are investigated. Presence of the reactive power in transmission networks decreases essentially quality of electric energy input that results in power losses, voltage subsidences and drops in power transmission lines, enforced increase of power transformers' power and cable sections in such networks. An engineering solution to decrease additional losses of a shunt reactor is proposed, analysis of different types of winding wire influence on this losses is carried out.

**Key words:** shunt reactor, Joule's & eddy-current losses, transposed & subdivided magnet wires, reactive power, economical operation.

**Method of computer simulation by finite element method of electromagnetic field distribution of the induction cooker / M.G. Pantelyat, Ju.V. Gurentsov** // Bulletin of NTU "KhPI". Series: Problems and Improvement elektricheski machines and aids. Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 16-24. – Bibliogr.: 14. – ISSN 2079-3944.

In the paper a technique for the numerical analysis of the induction cooker electromagnetic field distribution is proposed. The mathematical model of electromagnetic processes in structures under consideration represents a sub-system of Maxwell equations in the differential form with displacement currents neglected. Electromagnetic field calculation is carried out in 2D formulation by the Finite Element Method using a magnetic vector potential. In the general case, magnetic properties of ferromagnetic materials of the induction cooker yoke and heated dishes are taken into account. It is intended to carry out numerical investigations by using EleFAnT2D code developed at the Institute for Fundamentals and Theory in Electrical Engineering, Graz University of Technology, Graz, Austria.

**Key words:** induction cooker, electromagnetic field, computer simulation, the Finite Element Method.

**On the question of the classification of the voltage relay for the protection of domestic single-phase consumers from unacceptable voltage fluctuations in the mains / A.A. Chepelyuk** // Bulletin of NTU "KhPI". Series: Problems and Improvement elektricheski machines and aids. Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 25-36. – Bibliogr.: 12. – ISSN 2079-3944.

A classification of voltage-sensitive relays for protection of one-phase residential electrical customers against prohibitive voltage deviation in the supply main is presented. Main indications of voltage-sensitive relays' classification are selected: purpose, design, relay's nominal capacity and design current, way of technical implementation, type of output commutation element, voltage operating levels, time delay of reclosing, signalization of the relay's state, presence of internal protections, presence of additional functions, etc. The presented classification ranges information regarding structural, technical and functional peculiarities of such relays as well as demonstrates state-of-the-art of them.

**Key words:** over under voltage relay, household electrical equipment, over-voltage and under-voltage protector.

**The choice of a rational number of sources of power system load mutual traction electrical machines / A.M. Afanasov** // Bulletin of NTU "KhPI". Series: Problems and Improvement elektricheski machines and aids. Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 37-43. – Bibliogr.: 3. – ISSN 2079-3944.

Problems of selection of rational variants of traction electric machines mutual loading schemes to carry out their acceptance test are considered. It is substantiated that discrepancy of magnetic characteristics of traction electric machines tested by mutual loading at the stand with two feed sources requires essential margin of total normalized power of this sources. It is shown that from the point of view of test stand feed sources total normalized power, mutual loading schemes with one source are the most rational.

**Key words:** traction electric machine, test, mutual loading, power supplies, power, power loss.

**The influence of rotor imbalance on electromagnetic torque of switched reluctance motor / A.V. Kalinichenko** // Bulletin of NTU "KhPI". Series: Problems and Improvement elektricheski machines and aids. Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 44-54. – Bibliogr.: 5. – ISSN 2079-3944.

There have been considered the basic types of rotor imbalance and the causes of its appearance. After have been analyzed of last investigations and the literatures it was inferred that there is a need to replace the investigated electrical machine by an equivalent with the air gap which is distributed along the machine evenly, and the value of the rotor imbalance has been proposed to replace by the average value of imbalance of elementary machines. The objective of this article is to investigate the effect of different types of rotor imbalance and the amount of displacement on change of the parameters of electromagnetic torque curves of switched reluctance motors (SRM). There has been proposed the method of modeling the electromagnetic torque of SRM which is considered as an uneven of the air gap through rotor imbalance. There has been proved that the asymmetry of the magnetic system through the rotor imbalance effect on the phase current curves. In this article has been modeled the phase current and electromagnetic torque curves of SRM with balanced and imbalanced rotor. The conclusions about the effect of the value of rotor deviation from balanced state, and the type of imbalance on the parameters of electromagnetic torque curve, have been made.

**Key words:** switched reluctance motor, rotor unbalance, the electromagnetic torque.

**Evaluation of the actuator throttle device / G.V. Kulichenko, P.V. Leontiev, A.G. Korobov, D.S. Swinarenko** // Bulletin of NTU "KhPI". Series: Problems and Improvement elektricheskii machines and aids. Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 55-63. – Bibliogr.: 8. – ISSN 2079-3944.

Performed to evaluate the performance of the module, providing mode control throttling of natural gas. On a mathematical model of the module throttle control based on an induction motor analyzed transients move throttling valve that allows us to formulate requirements to parameters of the drive system to the operational characteristics of the object.

**Key words:** valves, induction motor, torque, positioning accuracy.

**The analysis of datas of temperature calculation of high-voltage cables with cross-linked polyethylene insulation / L.A. Scebenjuk, T.J. Antonec** // Bulletin of NTU "KhPI". Series: Problems of Electrical Machines and Apparatus Perfection. The Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 64-70. – Bibliogr.: 5. – ISSN 2079-3944.

World tendencies in the development of high voltage energy distribution systems for the last decades have been focused on implementing of cables with heat-resistant extruded insulation. This cables have a range of advantage consist of increased operating temperature of 90 °C. The analysis of datas of temperature calculation on power cables with cross-linked polyethylene (XLPE) insulation at for rated voltage of 64/ 110 kV AC. The work is devoted to creation of a method for calculation of the current rating of high-voltage cables. The temperature of insulation are calculated for the following conditions: conductor temperature 90 °C; ambient temperature 15 °C at in air.

**Key words:** high voltage energy of cable, cross-linked polyethylene (XLPE) insulation, temperature of insulation, water swelling tape.

**Automated system for remote control of power facilities with a low quality of electricity / O. Gryb, N. Belov, D. Gapon, T. Ierusalimova, A. Leleka** // Bulletin of NTU "KhPI". Series: Problems of Electrical Machines and Apparatus Perfection. The Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 71-77. – Bibliogr.: 5. – ISSN 2079-3944.

In the development of science and technology, development of novel technologies, increase of energy security of Ukraine and increase of precision of parameters of transmission of electrical energy, the telemechanization of energy objects plays the main role. The energy security of Ukraine is one of important problems of the independence of the country. One of essential components of its problem is full telemechanization of energy objects of Ukraine. By using communication channels and protocols of telemechanics, automatic transfer of parameters of electrical energy of telemetering, state of position of commutation equipment inside internal power systems, consolidated power system of Ukraine, as well as at the boundary of the balance belonging to state with which Ukraine has common power networks (Russian Federation, Republic of Belarus, Republic of Moldova, Hungary, Poland, Romania, Slovakia) are guaranteed – this is a main factor of its independence [1, 2].

**Key words:** telemetry, electricity, energy facility, substation, measurements, quality.

**Bot protection surge in power in the presence of higher harmonics / Gryb O., Shevchenko S., Gapon D., Ierusalimova T., Zhdanov R.** // Bulletin of NTU "KhPI". Series: Problems of Electrical Machines and Apparatus Perfection. The Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 78-86. – Bibliogr.: 8. – ISSN 2079-3944.

Overvoltage suppressors are protection devices used at high-voltage substations. These apparatus are main substation equipment protection against overvoltage. Overvoltage suppressor breakdown results in heavy accidents with power supply loss at substations. One of main overvoltage suppressor's characteristic is its capability. Overvoltage suppressor's normal operation is determined by its ability to absorb thermal energy in determined bands. Overvoltage suppressors' capacity is determined by their ability to stand current pulses influence without loss of operation characteristics.

**Key words:** speed limiter, overvoltage, quality, power, voltage, harmonics, bandwidth.

**Spectral analysis of measured voltage on pick-up coil of eddy current sensor / I.O. Kostyukov** // Bulletin of NTU "KhPI". Series: Problems of Electrical Machines and Apparatus Perfection. The Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 87-91. – Bibliogr.: 7. – ISSN 2079-3944.

Spectral analysis of measured voltage on pick-up coil of eddy current sensor in case of noise presence in a signal is made. Main components of noise that influence the measured voltage are found. Here such components are: white noise component, flicker noise component and a component which appears because of induced by some source electromotive force. The influence of noise on measured signal should always be considered in case of small values of signal that is true for example during control of electromagnetic properties of spiral ferromagnetic wire.

**Key words:** fourier transform, noise, Nyquist frequency, eddy-current sensor.

**DSTU IEC Standards: house without foundation ... / B.V. Klymenko** // Bulletin of NTU "KhPI". Series: Problems of Electrical Machines and Apparatus Perfection. The Theory and Practice. – Kharkiv: NTU "KhPI", 2014. – № 41 (1084). – P. 92-125. – Bibliogr.: 26. – ISSN 2079-3944.

A comparison of organizational and methodological approaches to the creation of the standards of the International Electrotechnical Commission (IEC) and national standards DSTU IEC. It is proposed to begin systematic work on the translation of the International Electrotechnical Vocabulary (IEV), under the auspices of the Technical Committee TC19 "Scientific and technical terminology" instead of false, according to the author's opinion borrowed the practice of issuing a DSTU standards IEC translations of international standards, and to apply them in the original, as it made in Eastern Europe.

**Key words:** standards, IEC, International Electrotechnical Vocabulary, IEV, DSTU IEC