Abstracts

ELECTROENGEENIRING: Prominent events and great names

Baranov M.I. **5**

E.C. Lenz as one of the founders of electromagnetic theory

A brief historical essay on scientific activity of the outstanding Russian physicist E.C. Lenz, who contributed greatly to development of theory of electromagnetic phenomena, is presented.

Key words – **history, essay, scientific activity**, **contribution, electromagnetic theory.**

Electrical Mashines and Apparatus

Chuvashev V.A., Varenyk Ye.A., Papazov Yu.N., Chuvankov V.Yu., Zheleznyakov A.V., Olenchenko A.V., Muhametshin N.A. **12**

Advanced research of the impact of rotor bars anisotropic conductivity on starting torque of an induction motor with a die-cast copper cage

The paper deals with an optimal design of an induction motor with a die-cast copper cage rotor characterized by an anisotropic layer in the upper part of the rotor bars. 1D FEM optimization of an explosion-proof induction motor with a die-cast copper rotor with overall parameters of a commercial induction motor with a die-cast aluminum rotor (180 kW, 1140 V, 1500 rpm) is made with the help of numeric computations. In the paper, the design features and experimental results are given. It is shown that induction motors with a special "starting" layer placed in the upper part the die-cast copper rotor bar have maximum value of starting torque for relative conductivity factors ranging from 0.3 to 0.5. The basic performance data obtained in both bench and service tests of a prototype 210kW induction motor are in close agreement with analytical data.

Key words – **induction motor, die-cast rotor, copper bars, conductivity, anisotropy, optimization, FEM.**

Burkovsky A.N., Rybalko O.A. **15**

Methodic problems of permissible reversal number determination for an induction motors with short-circuited rotor in S7 modes.

The article substantiates, with experimental data, a method of power loss calculation in the windings of an induction motor with a short-circuited rotor in transient modes and presents a technique for determining permissible reversal number in S7 modes.

Key words – **induction motor, short-circuited rotor, power loss, reversal number, calculation.**

Gurevich V. **18**

Microprocessor protection relays: new prospects or new problems?

The internal architecture and principles of operation of microprocessor-based devices including so-called "microprocessor protective relays" have little in common with devices called "electric relays". But microprocessor-based relay protection devices are gradually driving out the traditional electromechanical and even electronic relay protection of virtually from all fields of power and electrical engineering. Advantages of microprocessor-based protection means over traditional ones are far from being absolute or obvious, yet this is a general trend. In reality, however, microprocessor-based protection means have several specific drawbacks too. In this paper, some of these problems are discussed.

Key words – **microprocessor-based relay, protection device, advantages, drawbacks.**

Pavlenko T.P. **27**

Characteristic factors for particle emission from contact surface.

The paper analyzes factors concerning feasible movement of voltaic arc on the contact surface. Assumptions based on quantum-mechanical solid-state theory, thermal electron emission and diffusion phenomena are given.

Key words – **particle emission, voltaic arc movement, contact surface, assumptions.**

Pelevin D.E. **32**

Optimization of magnetic field control electromagnet parameters.

Criteria for magnetic field control electromagnet optimization over weight and power consumption for a given maximum overall dimension are specified. A calculation procedure for cupped electromagnets that may be applied in engineering calculation techniques is introduced.

Key words – **field control electromagnet, criteria, optimization, calculation procedure.**

Sereda A.G., Fetyuhina E.V. **35**

Computations of polarized magnetic circuit of an output relay for a circuit-breaker semiconductor release

A feasibility of polarized magnetic systems application in designs of a semiconductor release output relay for small-size VA-series current-limiting circuit-breakers is considered.

Key words – **output relay, current-limiting circuit-breaker, polarized magnetic circuit, computations.**

Shumilov YU. A. Chebanyuk V. K. **39**

Experimental and analytical investigations of high-harmonics magnetic field of a cage induction motor

Results of experimental investigations of influence of steel saturation on harmonics value of flux density in a cage induction motor air gap are presented. Distribution of high-frequency fields in the rotor slot, different parts of the rotor core, frame yoke as well as results of the rotor bar current high-harmonics measurements in the rotating motor are given. Experimental results are in good qualitative agreement with analytical results obtained with a finite element method.

Key words – **cage induction motor, magnetic field, flux density harmonics steel saturation.**

Electric stations

Electrical Engineering: Theory

High Electrical and Magnetic Field Engineering