Electromagnetic fields, characteristics and practical structures of linear induction machines with a short operating body

Vasilii V. Tiunov

Abstract. Linear induction motor is created and investigated. The computations is made on the basis of electromagnetic field theory for specific calculation models of the linear induction motor with a solid working body of limited length moving with respect to an inductor.

Contents

Identification of starting currents of induction motors in a branched power network and its protection from remote short circuit

Oleksandr G. Sereda

Abstract. The digital processing of signals from the current and voltage sensors is analyzed that allows empowering the protective ability of circuit breakers units. The possibility of identification of fast increasing currents in a transient mode of disturbances in power electrical networks is proved.

Contents

Estimation of induction generator overload capacity under connected direct current consumers

Mykhaylo Zagirnyak,
Iurii Zachepa, Vladimir Chenchevoi

Abstract. The operating conditions of the system consisting of induction generator, capacitor bank and rectifier load is investigated. The harmonic analysis is performed for currents and voltages of a self-contained induction generator with capacitor excitation when direct current consumers are connected to it. It is demonstrated that the evaluation of the overload capacity of a self-contained power supply with an induction generator operating for a direct current consumer is to be made on the basis of the balance of active and reactive powers of all the electromechanical system elements.

Contents

System of wireless magnetic sensors for detection and identification of ferromagnetic vehicles

Kazimierz Jakubiuk, Piotr Jankowski,
Mirosław Wołoszyn

Abstract. Deformation of the Earth's magnetic field by land vehicles is studied. Based on analysis of the shape of the magnetic field deformation, it is possible to detect and identify a vehicle. To eliminate the interference of the Earth's magnetic field by the environment, the measurements have been performed in a differential configuration. Under a development project, a wireless system of magnetic sensors to monitor traffic at the airports, ports and border crossings has been built. The paper presents the approximate identification of a vehicle based on the shape of the distribution of the vertical component of magnetic induction.

Contents

Analytical model of the expansive force for solid expandable tubing

Wang Zhenquan, Ju Pei,
Zhai Yinghu, Su Dongyu

Abstract. The expansion process of solid expandable tubing subjecting to large plastic deformation due to rigid conical mandrel is investigated. Equilibrium equations are used to develop analytical model which relates the expansion ratio, tubing initial thickness, friction coefficient and the mandrel configuration to the force required for expansion. The finite element analysis is used to validate the theoretical results. A good agreement is obtained in terms of expansion force for different geometric constraints. The study shows that the expansive force exhibits a biquadratic behavior with respect to the expansion ratio and length of sizing cone, and a linear behavior with respect to semi-cone angle and friction coefficient. The optimum semi-cone angle of mandrel should be greater than $10°$.

Contents

Comparative study of effect of thermal gradient on free vibrations of clamped visco-elastic rectangular plates with linear and parabolic thickness variations in both directions

Harvinder Kaur, Arun K. Gupta

Abstract. Thermal effect on free transverse vibrations of clamped (c-c-c-c type) rectangular plate with linear and parabolic thickness variations in both directions is modeled mathematically and the results are presented in the form of a comparative study. The Rayleigh–Ritz method is applied to give a good approximation for the frequency corresponding to the first two modes of vibration for both the cases of thickness variation. Only linear temperature variation has been considered in both the cases. The solution is assumed as a two terms deflection function. This model represents the comparison of deflection and time period corresponding to the first two modes of vibrations of clamped plate for various values of aspect ratio, thermal constants, and taper constants. The results would really useful for engineers in designing and fabrication of various structures minutely.

Contents