

Selected aspects of levitation heating of electrically conductive bodies

DAVID KOLÁŘ

Abstract. Levitation heating of nonferromagnetic electrically conductive bodies is numerically modeled. The process represents a coupled problem whose basic mathematical model consists of two partial differential equations describing the distribution of electromagnetic and temperature fields. The methodology of its solution is illustrated by a typical example whose results are discussed.

[Back to Contents](#)

Progress in eddy-current non-destructive evaluation of conductive materials

LADISLAV JANOUŠEK, KLÁRA ČÁPOVÁ,
DANIELA GOMBÁRSKA, MILAN SMETANA

Abstract. Recent progress in eddy current non-destructive evaluation is discussed. The basic principle of the method is shortly explained and its possible applications in non-invasive evaluation of conductive materials are summarized. The main aspects connected with application of the method in practice are described in details together with actual issues of research and developments. Special attention is paid to eddy-current testing probes and to the evaluation of an indicated defect from eddy-current testing signals. Authors' group activities in this field are presented on the basis of the reported current state-of-the-art.

[Back to Contents](#)

Dielectric spectroscopy of glucose turnover in cancerous tissue model

DAGMAR FAKTOROVÁ

Abstract. Dielectric spectroscopy, measurement and calculation of dielectric properties of normal and carcinoma tissue phantoms are investigated. Special attention is paid to finding dielectric properties of carcinoma tissue model with different content of water and glucose. Investigated are dielectric qualities of pure glucose, glucose in solutions and also in phantoms of biological tissues with the aim to find their influence on the tumours cells. The basic tool of this research is the microwave technique. Simple and well-known theoretical formulas are used for unambiguous determination of complex permittivity. Experimental results and their evaluation are also presented.

[*Back to Contents*](#)

Influence of lift-off and excitation frequencies on detected signal from BSCC heart valve

TATIANA STRAPÁČOVÁ, KLÁRA ČÁPOVÁ

Abstract. Eddy current testing of the Björk-Shiley Convexo-Concave (BSCC) heart valve integrity is discussed with respect to its detection capabilities. Influences of the lift-off and excitation frequencies on detected signal originated from cracked outlet strut are investigated. The defect occurring in the BSCC heart valve is described, and simulations, obtained results and their interpretation are presented.

[Back to Contents](#)

Improvement of image reconstructions using level set method

JARMILA DĚDKOVÁ, PETR DREXLER

Abstract. A new approach to image reconstruction problems is proposed to improve results applying the level set technique during a reconstruction process that is based on electrical impedance tomography (EIT). Recently described methods are often based on deterministic or stochastic approach to solve EIT inverse problem, which is nonlinear and highly ill-posed. The suggested approach combines advantages of nowadays used deterministic methods such as Tikhonov regularization method with advantages of the level set method. A new way is applied to the tissue conductivity reconstruction. Numerical results of the improved image reconstruction based on the proposed new technique are presented and compared with previous results.

[Back to Contents](#)

Modelling and measurement of permanent magnets

TOMÁŠ MIKOLANDA, MILOSLAV KOŠEK, ALEŠ RICHTER

Abstract. A universal and efficient model of permanent magnets based on the bound surface and volume currents is discussed. This model allows calculating the flux density produced by the magnet by numerical integration using the Biot-Savart law. To verify the model, a precise and fully automated apparatus for measurement of 2D magnetic fields was built. The apparatus is characterized by an extremely low error and may also be used for revealing various imperfections of industrially produced permanent magnets.

[Back to Contents](#)

Selected problems of cooperation between asymmetric receivers and synchronous machine in a low-voltage network of an industrial plant

JAROSŁAW JAJCZYK, ZBIGNIEW STEIN, MARIA ZIELIŃSKA

Abstract. Analysis of the effect of a group of asymmetric receivers of RL type on the battery of static capacitors and a synchronous machine connected to a common low-voltage network of an industrial plant and supplied from an own transformer is presented. In result of the analysis a proposal of a limit of the degree of the receiver asymmetry is formulated with a view to preventing harmful effect on the synchronous machine and the battery of capacitors. The analysis considers the influence of the asymmetry on the currents flowing in the transformer, the synchronous machine, and the capacitor.

[*Back to Contents*](#)

Simple method of fuzzy linearization of non-linear dynamic system

DANIELA PERDUKOVÁ, PAVOL FEDOR

Abstract. A method of obtaining a simple fuzzy model of a nonlinear dynamic system is presented, for which only external information is available (i.e. the measured dependencies between the inputs and outputs). Demonstrated is one of the possibilities of its application for the purpose of control on the basis of an inverse fuzzy model. The method is first explained by means of simple examples, followed by the presentation of results of its application in the control of a drive with asynchronous motor. Experimental measurements on an AC inverter-asynchronous motor system, carried out by means of a Real Time system, have confirmed the method proposed as correct and functional, and suitable for application also for other nonlinear systems.

[Back to Contents](#)