# Minimax approach to solving some inverse problems for Maxwell equations

Yuri Podlipenko
Kiev University, Faculty of Cybernetics, Kiev, Ukraine

Problems of optimal reconstruction of solutions and right-hand sides of Maxwell equations under incomplete data are investigated. These problems play an important role in electromagnetics. Depending on a character of an apriori information, stochastic or deterministic approach are possible. The choice is determined by nature of the parameters in the problem, which can be random or not. Moreover the optimality of estimations depends on a criterion with respect to which a given value is evaluated.

We assume that right-hand sides of Maxwell equations are unknown and belong to the given bounded subsets of the space of all square integrable functions in the considered domain and for solving the estimation problems we must have supplementary data (observations) depending on solutions of these equations. We suppose that observation errors are realizations of the stochastic processes, with unknown moment functions of the second order also belonging to certain given subsets.

Our approach is as follows. We are looking for linear with respect to observations optimal estimates of solutions and right-hand sides of Maxwell equations from the condition of minimum of maximal mean square error of estimation taken over the above subsets. We consider constructive methods for obtaining such estimates, which is expressed in terms of solutions of special integro- differential equations.

It should be noted that beyond purely theoretical interest, the mentioned problems can have interesting applications, for automatized measurement data processing systems, for interpretation of electromagnetic observations.