PREFACE

The series of Japan-Hungary Joint Seminars on Applied Electromagnetics in Materials and Computational Technology are established to stimulate the exchange of creative ideas and promote the new achievements by bringing together the scientists working in the field of applied electromagnetics to report on their recent advances and to discuss the problems of future research.

The seminars cover a wide range of topics, extending the theoretical discussion of applied electromagnetics to new numerical models and various applications. The seminars include sections as e.g. general theory of electromagnetic fields, eddy current, coupled and nonlinear fields, magnetic field and materials, electromagnetic waves, inverse problems, biomagnetics, free surface problems, fractals and high voltage problems.

The series of Japan-Hungary Joint Seminars were planned to bring alive in 1990. The first Japan-Hungary Joint Seminar was held on 1-3 July, 1991 in Budapest, organized by the Department of Electromagnetic Theory, Technical University of Budapest. The second Seminar was organized by the Faculty of Engineering, Hokkaido University, Sapporo, Japan and it was held on 16-18. September 1992. The third one is planned to held in Hungary, organized by the Technical University of Budapest, on July 1994. The sponsors of the Seminars are the Foundation of Hungarian Credit Bank (1991), the Japan Society of Applied Electromagnetics (1991), (1992), Technical University of Budapest (1992), and Hungarian Society of Appiled Electromagnetics (1994).

On the second Japan-Hungarian Seminar more than 50 participants took part, representing a wide spectrum of universities and industrial research institutes from Japan, Hungary and other countries.

The subject of the first section was the biomagnetism with four papers reported results on neuromagnetic studies, source estimation of magnetic energy generator and application of the space power distribution method for human heart diagnosis with attractive realizations.

In the second section of eddy current problems six presentations were performed reporting results on numerical simulation of electromagnetic field in type-II superconductors, on analysis of magnetic field and its damping effect. New results on numerical methods in application of the boundary

integral equation method for eddy current type equations, on introduction of edge elements in solution of boundary element method and on coupling the finite difference method with finite elements in two-dimensional field problem were presented.

In the third section three papers were presented on solutions of inverse problems. They dealt with material defect identification on the basis of electrical potential method, with introduction different finite element models as well as evaluating the global optimization method for crack problems.

The fourth section was devoted to the fractals with four papers working on the geometry and dynamics of growing rough surfaces, on the diffusion limited aggregation and dielectric breakdown. The section was completed with experimental studies on surface modification by ion beam.

In the fifth section on free surface problems seven papers were presented. They worked with determination of the pattern formation of ice crystal and the numerical simulation of ice growing by boundary element method. Presentations dealt with the surface simulation of melted metal and of aluminium electrolyte as well as with determination of equilibrium shape in electromagnetic levitation. The section was completed with an automatic numerical element generation for finite elemnt analysis.

The sixth section with seven papers was devoted to determination and simulation of magnetic field and its shielding effect and to simulation of nonlinear characteristic of the magnetic material.

The seventh section of the electromagnetic waves was the most popular with eleven presentations reporting new results on inhomogeneous wave guides, their eigenvalue problems and antennas.

The eigth section of high voltage problems with four papers represented the results on modelling corona discharges, breaking processe in isolations, high voltage fuses and problems on grounding electrodes.

The papers presented at the seminar according to the selection of the Scientific Committee are offered to publish in the International Journal of Applied Electromagnetics and in Journals of both Universities. This sample of Periodica Polytechnica is a special issue of the Department of Electromagnetic Theory, Technical University of Budapest, publishing edited versions of a group of papers presented at second Japan Hungary Joint Seminar in Sapporo, on 16-18. September 1992.

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