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Fundamentals of Computation Theory

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PREFACE

The volume constitutes the proceedings of the 1977 International Conference on Fundamentals of Computation Theory ("Algebraic, Arithmetic, and Categorical Methods in Computation Theory") held in Poznań - Kórnik, Poland, September 19-23, 1977. The Conference is the First One in the planned series of the FCT-Conferences organized every odd year.

The Computability Theory has come of age now. Its first results were applied by those interested in Logic and Foundations of Mathematics, later on, were mainly applied by those motivated by the real computational problems from the advent of modern computers. Subsequently, the theory developed by this second stream, suddenly, has had a great impact on Logic again. The famous decidability results on the fragments of Second Order Theories of the sixties were a good example of it. So we get a beautiful instance of what might be called an application of 'practical computability' to pure mathematics again.

Also, independently of all the physical motivations, the body of research known as Computation Theory has become part of Mathematics, with its own deep results, famous open problems and aesthetic values. Its methods are often bordering Algebra, Logic, Number Theory, Category Theory, Combinatorics. Very often some computational problems are easily expressible in terms understandable by the layman, their solution, however, turned out to depend on a high level abstraction and abstruse methods.

The idea of a specialized series of FCT-Conferences devoted to the theoretical aspects of Computation Theory and its conceptual backdrops was originated in Poland sometime early in 1975. The following persons should share the responsibility for its consecutive development, and all the valuable suggestions in the next two years:

J.R. Büchi, L. Budach, R.G. Buhkaraev, H. Ehrig, J. Grzymała-Busse, J.H. Hoehnke, R. Knast, W. Marek, Z. Pawlak, A. Pultr, A. Salwicki, Z. Semadeni, D. Siefkes, V. Trnková, W. Wechler, J. Winkowski, A. Wiegner.

More than 60 papers are the text of the addresses given by invi-

tation of the International Program Committee, falling in one of the two categories: -invited addresses, and -(selected) contributions to the following three Symposia: - A. Algebraic & Constructive Theory of Machines, Computations and Languages; - B. Computation Theory in Category; - C. Computability, Decidability & Arithmetic Complexity. The shorter communications (-symposia contributions) were selected from the large number of papers received by the organizers before the Conference. My special thanks, at this place, go to the FCT-Program Committee constituted in 1976 (which I have had pleasure to chair) - of over thirty anonymous referees - for their valuable time devoted to reading submitted papers.

The Conference was organized by the Mathematical Institute of the Polish Academy of Sciences, and co-sponsored by the University of Poznań, Technical University of Poznań, the Polish Mathematical Society, and some number of other Universities, Research Institutes, and the Associations. The Organizing Committee consisted of: L. Budach, J. Grzymała-Busse, J.H. Hoehnke, M. Karpiński, R. Knast, W. Marek, Z. Pawlak, A. Pultr, A. Salwicki, Z. Semadeni, and A. Wiweger.

The Committee owe special debt to Professors Cz. Olech (Head of International Banach Center) and Z. Semadeni, the Directors of the Mathematical Institute, to Z. Pawlak of Computational Center of the Polish Academy of Sciences, and to M. Wiewiórowski, the Scientific Secretary of the Poznań Branch of the Academy, for finding all the necessary funds and their continuous support in all the organizational matters before the Conference. I wish also to thank the many persons, too numerous to name, who contributed their generous help in arranging the Conference. Without their altruistic support and enthusiasm this Conference would hardly exist in the present shape.

Finally, I would like to thank W. Wojciechowska of Poznań, and I. Mayer and A. Peters of Heidelberg (Springer-Verlag) for their assistance, and an excellent cooperation on the edition of the present volume.

The publication of the Proceedings has been performed by Springer-Verlag in the very short time.

Marek Karpiński

June 1977.

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