# Preface

Professor Dr. Adelina Georgescu, ROMAI President

This second (and last) volume contains part of papers presented to the conference on applied and Industrial mathematics (CAIM), held in Oradea, Romania, in the period May 29-31, 2003, and coorganized by University of Oradea and Romanian society of applied and industrial mathematics (ROMAI). In the first part of the volume we include 25 contributions (most of them written in english) to research sections while in the second part - 8 contributions (written in Romanian) to education section.

There is a variety of topics reflecting the concern of various research teams and / or directions to which the CAIM 2003 participants belong. Some of these topics are traditional in CAIMs., e.g. fluid mechanics and its applications (to airspace and naval industries, ecology, meteorology, physiology); dynamical systems and bifurcation and their applications (to fluid dynamics, biology, medicine, communications security, economics). Other papers belong to the new and strong trend in information systems, e.g. computer science, artificial intelligence, and are concerned with: digital signature, image quality (when zoomed, compressed or decompressed), integrity in distributed database, computer packages for analysis of variance, genetic algorithms. These treatments are applications of code theory (cryptography), algebra, dispersional analysis and logic. It is for the first time that a paper of application of operational research to container loading was presented at CAIM.

Applied an industrial mathematics is directly related to pure mathematics, education in maths, particular sciences and industry. The first two domains are well represented in CAIMs. Researchers in physics are our collaborators from the very beginning. We remark that at CAIMs there are not so many economists, physicians, biologists, chemists as desired. Like throughout the world, the connection to respective domains are realized by physicists. It is also a different task, especially for ROMAI, to attract engineers directly involved into the productive activity. Partly this is due to the weakness of our industry and, consequently, to the reorientation of our good specialists (engineers) towards higher education, research or industrial units from other countries. In exchange, more and more specialists in computers, directly involved in industrial applications came towards ROMAI and CAIMs, in accordance with the trend throughout the world. In these circumstances our colleagues in ROMAI and CAIMs defined themselves as a selected group of specialists aiming to coordinate information and produce research related to the four above mentioned domains.

Having in view the preponderance of theoretical approaches in CAIMs papers, we encouraged fundamental research (of complex analysis, category theory, differential equations) too. This represents a promise for seniors research contribution in the future.

Apart from pure mathematicians, to CAIMs we invited high school teachers of maths to join us. In fact, more or less, they are responsible for the first stage in training maths with its two aspects: informative and formative. We had the proof of the large echo to our invitation and the manifest will of maths teachers to contribute to an applications - oriented teaching of maths. They are convinced that it is their duty to signal out to their scholars the newest achievements in maths and to motivate their lectury on the most arid parts of maths by attractive as well as useful examples from everyday life, industry, economy, society. At the same time they must create bridges between mathematics and other sciences and reveal their interconnections, in view of an appropiate reasoning in their future interconnected activities. These are the reasons why the second part of this volume contains the papers of the newly (namely in 2002) introduced section on education. This proved to be of a more and more increasing interest not only among maths teachers but also among students in maths and their professors. Some papers in this section plead for the introduction into school curricula of elements of new (e.g. fractal geometry) or very important (e.g. statistics and probability) branches of mathematics; some others adopt an interdisciplinary view point; others reveal the frequent occurrence in applications of certain mathematical topics less known even to mathematicians (e.g. related to calculus of variations). There is also the care for the formation of deep reasoning through geometry. We also draw attention to a paper devoted to agreeable teaching of maths through recreative games. Another paper treats an elementary topic of calculus which can create discomfort in complicated concrete applications.

We remark an optimal collaboration with the authors during the preparation of their works for publication. However, there are two papers whose authors was not possible to contact in due time, such that the reader is prayed to forgive us for the remained slips, in spite of our efforts to eliminate all of them.

We thank all authors from Romania, Republic of Moldova, Italy and Canada for providing the readers of these volumes with high level, clear, modern and useful papers.

Special thanks are addressed to the hard core of CAIMs participants, most of them ROMAI members, for the continuation of these prestigious conferences in Romania but with an international participation. Along with a few other scientific meetings in our country, CAIMs heavily contributed not only to the survival but also to the development of Romanian School of Mathematics, let it be pure or applied. Indirectly, through serious applications to industry, ecology, economics, medicine and communications, and through increasing level of maths education, CAIMs are helping the development of Romania and good relationships with other countries. They also created the opportunity for a renewal of the collaboration between researchers from Romania and their former colleagues who actually are practicing mathematics abroad. During all its existence, since 1992, ROMAI, and, so, CAIMs, benefited from material, scientific and moral support for these colleagues. We thank to them vividly, even if, by various reasons, they are no longer ROMAI members and / or CAIMs participants.

We address our warm thanks to Oradea Organizing committee and especially to Prof. Dr. Ioan Dzitac, constantly benefiting to the important support of the Rector, Prof. Dr. Theodor Maghiar, for their decisive contribution to the notable success of CAIM 2003: the number of participants exceeded 150 and the contributions were more than 85.

We also thank to all those who made possible the issue of these Proceedings and especially to Prof. Dr. Ioan Mang, Prof. Dr. Mircea Balaj and to Assoc. Prof. Dr. Ioan Dzitac's young collaborators Daniel Erzse and Horea Oros.

Let us meet again to CAIM 2004 in Pitesti, October 15-17.

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