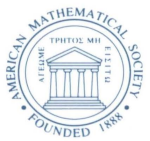
CONTEMPORARY MATHEMATICS

190

# Mathematical Analysis, Wavelets, and Signal Processing

An International Conference on Mathematical Analysis and Signal Processing
January 3–9, 1994
Cairo University, Cairo, Egypt

Mourad E. H. Ismail
M. Zuhair Nashed
Ahmed I. Zayed
Ahmed F. Ghaleb
Editors

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# Preface

This volume contains the proceedings of an international conference that took place at Cairo University, Cairo, Egypt, January 3–9, 1994. The theme of the conference, Mathematical Analysis and Signal Processing, was so chosen to attract both mathematicians and engineers and to create an atmosphere of interdisciplinary interaction.

Nowadays there is a high demand for such an interaction because of rapid advancements in the field of signal analysis and signal processing caused by recent mathematical and engineering discoveries, such as wavelets, multiresolution analysis, and subband coding schemes. Other traditional areas of mathematical analysis, such as sampling theory, approximation theory, and orthogonal polynomials have proved themselves to be very fruitful in solving many signal processing problems.

A secondary purpose of the conference was to bring together scholars from the Middle East and the West to establish foundations for future collaboration. The conference provided a forum for over 54 mathematicians and engineers representing 10 countries to exchange ideas and discuss new research trends. With over two-thirds of the participants being from outside the Middle East, the conference became the largest mathematical gathering in the modern history of Egypt in terms of foreign participation.

The proceedings comprise invited and contributed papers, some are of mathematical and some are of engineering nature. All are original and have not appeared in publication before. Some of the topics covered are applied analysis, approximation theory, orthogonal polynomials and special functions, sampling theory, wavelets, and applications to signal processing. Due to space limitations, we have not been able to publish all the papers presented at the conference.

The conference also coincided with Professor Paul Butzer's announcement for retirement. This spurred many of the participants to dedicate their papers to him in appreciation of his contributions to the subject.

Inspired by the location of the conference and the glorious ancient history of Egypt, Professor Paul Butzer wrote an article for the proceedings on the mathematics of ancient Egypt and its connection with the Latin West. The article traces how the mathematical concepts of ancient Egypt found their way to the Latin West.

Finally, it should be mentioned that our enthusiasm for the conference was equally shared by the Mathematics Department, Faculty of Science, Cairo University and The Division of Science in Developing Countries Program (SDCP) of the National Science Foundation, and it was through their generosity that the conference became a reality. We would like to express our gratitude to Dr.

Edward Murdy, the director of the SDCP, for his support and understanding. We are indebted to the Mathematics Department and the Department of Sponsored Research at the University of Central Florida for providing us with technical and secretarial assistance. Our thanks also go to the referees and to Mr. Yanmu Zhou for TeXing the manuscripts.

The Editors

**Mathematical Analysis, Wavelets, and Signal Processing**

Mourad E. H. Ismail, M. Zuhair Nashed,
Ahmed I. Zayed, and Ahmed F. Ghaleb, Editors

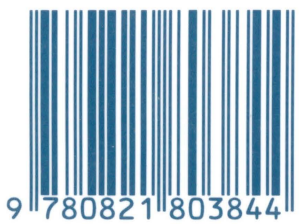
This book contains the proceedings of an international conference held in Cairo, Egypt (January 1994). This glorious ancient city was the gathering place for mathematicians and engineers to exchange ideas and to discuss new research trends.

Mathematics and engineering discoveries, such as wavelets, multiresolution analysis, and subband coding schemes, caused rapid advancements in signal processing, necessitating an interdisciplinary approach.

Contributors to this conference demonstrated that some traditional areas of mathematical analysis—sampling theory, approximation theory, and orthogonal polynomials—have proven extremely useful in solving various signal processing problems.

■ Features P. L. Butzer on...

*Mathematics in Egypt and Its Connections with the Court School of Charlemagne*

With several articles discussing the most recent advances and new trends in mathematical analysis and signal processing, this book emphasizes interactions between mathematics and electrical engineering.

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