PREFACE

Since its first edition organized in 1981, the Meeting "International Conference on Waves and Stability in Continuous Media (WASCOM)" is aimed at bringing together Italian and foreign researchers who are interested in stability and wave propagation problems in continuous media, and to discuss leading aspects of these areas of research.

This meeting has taken place, since then, every two years with increasing interest and participation. The latest conference, the XIII edition, was held in Acireale (Catania), more precisely in the village of Santa Tecla, June 19-25, 2005.

Previous Conferences were held in Catania (1981), Arcavacata di Rende (Cosenza, 1983), Giovinazzo (Bari, 1985), Taormina (Messina, 1987), Sorrento (Napoli, 1989), Acireale (Catania, 1991), Bologna (1993), Altavilla Milicia (Palermo, 1995), Capitolo di Monopoli (Bari, 1997), Vulcano (Messina, 1999), Porto Ercole (Grosseto, 2001) and Villasimius (Cagliari, 2003). After each edition, a volume of proceedings documenting the research work and progress in the area is published.

The research groups promoting the XIII edition of the conference belong to the Departments of Mathematics of the universities of Bologna, Lecce, Messina, Napoli, Palermo, Torino-Politecnico and, of course, Catania which was in charge of organizing the meeting. These groups, since many years, are very active in the field of waves and stability and belong to a national project supported by the Minister of Education.

The XIII edition registered over one hundred participants coming from more than 15 different countries. A special session was dedicated to Prof. Dionigi Galletto (University of Turin) and to Prof. Ingo Müller (Technical University of Berlin) who have participated to several editions of the conference and that have given important scientific contributions in their respective research areas.

The topics covered were

- *Non-linear wave propagation*
- *Linear and non-linear stability in fluid dynamics*
- *Small parameter problems*
- *Kinetic theories towards continuum models*
- *Extended thermodynamics*
- *Transformation groups and reduction techniques*
- *Numerical and technical applications.*

The meeting encompassed various sectors of waves and stability such as global existence of smooth solutions and Riemann problem for hyperbolic systems of balance laws and related wave phenomena, diffusion in biology, diffusion in continuum mechanics, with applications in the environment and technology as, for example, pollution control.

Non-linear stability and waves featured strongly, so a wide relevance has been devoted to finite time blow-up in PDE's, flows in porous media, low temperature phenomena such as second sound waves, kinetic models, extended thermodynamics, group analysis techniques that allow to perform an analysis more deepened of the proposed models, regarding both the constitutive aspects (techniques of classification) and the search of exact solutions.

This volume contains 73 papers which have been presented at the XIII Conference as invited lectures and short communications. The Editors of this volume would like to thank the Scientific Committee who carefully suggested the invited lectures and selected the contributed papers, as well as the members of the Organizing Committee, coming from the Department of Mathematics and Informatics of the University of Catania. A thank also to Sandra Pieraccini (Politecnico di Torino) who has carefully prepared the final editing of the manuscript. A special thank is addressed to all the participants to whom ultimately the success of the conference has to be ascribed. Finally, the Editors are especially indebted to *Fondazione CRT di Torino* which has partially supported the publishing expenses of the present book.

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