Foreword

The conference "Wave Motion" that took place in the period January 25-31, 2004, at the *Mathematisches Forschungsinstitut Oberwolfach*, Germany, was devoted to the study of nonlinear wave phenomena. Waves lie at the forefront of modern applied mathematics and theoretical physics. The study of wave phenomena leads to a variety of difficult mathematical issues, involving several domains of mathematics (e.g. partial differential equations, functional analysis, harmonic analysis, dynamical systems). Fluids have been a rich source of deep mathematical theories for over 200 years. The conference focused on two very active research areas involving fluids:

- free surface water waves,
- current aspects of integrable systems and solitons.

Other aspects of the theory of nonlinear waves were also covered. The program consisted of several talks presented by specialists coming from England, France, Germany, Japan, Norway, Sweden, Switzerland, USA, and of three discussion sessions on the topics "Open Problems in PDEs", "Stability Theory for Nonlinear Waves", and "Geometry and Fluid Dynamics". Moreover, several Ph.D.-students and post-doctoral fellows participated to the workshop and did benefit from the unique academic atmosphere at the Oberwolfach Research Institute.

This issue of the *Journal of Nonlinear Mathematical Physics* comprises a representative selection of the topics discussed on this occasion. It is a refereed selection of contributions submitted in response to a call for papers issued at the meeting. We are grateful to Norbert Euler for agreeing to publish these proceedings.

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