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## Preface

The present volume is a collection of papers mainly concerning *Phase Space Analysis*, also known as *Microlocal Analysis*, and its applications to the theory of *Partial Differential Equations* (PDEs).

The basic idea behind this theory, at the crossing of harmonic analysis, functional analysis, quantum mechanics and algebraic analysis, is that many phenomena depend on both position and frequency (or wave numbers, or momentum) and therefore must be understood and described in the phase space. Including time and its dual variable, the energy, leads to the space-time phase space. From this perspective major progress has been achieved in the analysis of PDEs over the last forty years, based on the development of powerful tools of microlocal analysis.

A number of the following papers, all written by leading experts in their respective fields, are expanded versions of talks given at a meeting held in October 2007 at the Certosa di Pontignano, a former 1400 cloister sprawling on the hills surrounding Siena.

The Siena workshop was in honor of Ferruccio Colombini on the occasion of his 60th birthday and it is our pleasure to dedicate to him this volume, to which a number of friends and collaborators promptly manifested their willingness to contribute.

In this sense the present volume can be seen as a scientific portrait of Ferruccio.

Many people deserve our gratitude. We would like to thank all the contributors as well as the people who took part in the workshop, who made a lively mathematical attendance.

A number of institutions made possible to hold the Siena workshop through their financial support. They are the Italian Ministero dell'Istruzione, dell'Università e della Ricerca, Gruppo Nazionale per l'Analisi Matematica,

la Probabilità e le loro Applicazioni, Università di Bologna, Università di Pisa and the scientific cooperation agreement between the universities of Pisa and Paris VI. We thank all of them for their generosity.

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Note added in Proofs – During the preparation of this volume, on November 22, 2008, Prof. M. K. Venkatesha Murthy passed away after a sudden and brief illness. He was an outstanding mathematician, a friend and an example for us.

[A. B., D. D. S.]

Advances in Phase Space Analysis of Partial Differential  
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