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Introduction

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ATTRACTORS, INERTIAL MANIFOLDS AND THEIR APPROXIMATION

INTRODUCTION

This volume is made from contributions presented at the Conference « Systèmes Dissipatifs en Dimension Infinie » which was held at the Centre International de Rencontres Mathématiques at Marseille-Luminy, France, September 14-18, 1987. The Conference was part of the « Année Non Linéaire », special year on nonlinear analysis organized by the Centre National de la Recherche Scientifique and the Ministère des Universités et de la Recherche. We should like to acknowledge with thanks, grants from these institutions as well as from SMF, SMAI and DRET.

The aim of the Conference was to present new advances on the dynamics of dissipative nonlinear partial differential equations, in connection with the applications (Fluid Mechanics, Nonlinear Optics, Combustion, Reaction-diffusion, ...). The Conference was attended by 35 participants including 20 lecturers, mathematicians and physicists.

Discussed were attractors and inertial manifolds, from the exact and approximative point of view. Also applications of the theory of dynamical systems to the study of qualitative properties of nonlinear partial differential equations, bifurcations, instabilities and chaos in fluid mechanics, combustion and nonlinear optics. Our knowledge on these questions has increased in the recent past and certainly we have now a better understanding of chaotic phenomena in complex dissipative systems.

We hope that this volume will be an useful tool and will show the richness and the variety of the results obtained so far. The articles included in this volume are updated versions of the oral communications. Most of the lecturers have provided a written communication but the volume includes also the communications of invited speakers who could not attend.

Beside its interest in relation with the understanding and the modelling of turbulence, the subject is of particular importance from the numerical viewpoint for the *approximation of dissipative evolution equations on large intervals of time,* in dynamically nontrivial situations. Thanks to the considerable increase of the computing power during the last years, this problem is now at hand. Hopefully this volume will help the readers of M^2AN becoming familiar with this new type of numerical problems.

Finally we should like to thank, beside the sponsoring organizations, all the participants to the conference and all those who contributed to this volume.

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