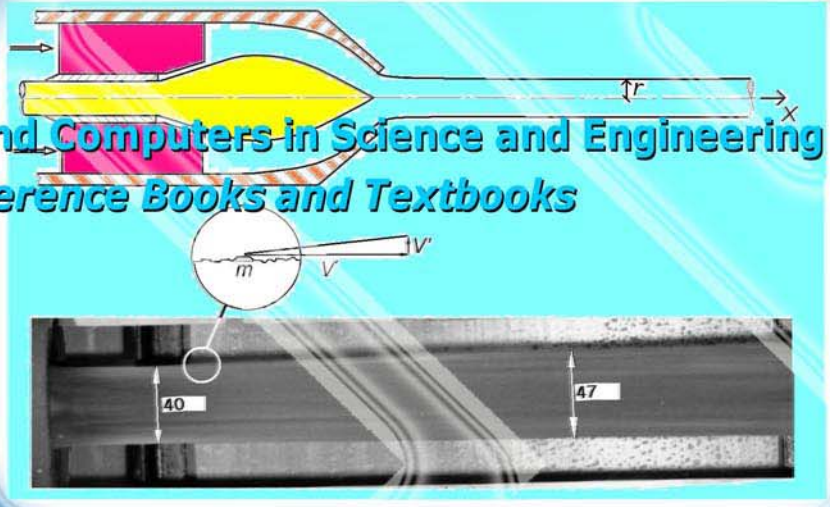
EDITORS: Siavash H. Sohrab (USA) • Haris J. Catrakis (USA)
Nikolai Kobasko (USA) • Sarka Necasova (Czech Republic)

FLUID MECHANICS & AERODYNAMICS

Published by WSEAS Press, www.wseas.org

Proceedings of the 5th IASME / WSEAS International Conference on FLUID MECHANICS and AERODYNAMICS (FMA'07)

Vouliagmeni, Athens, Greece, August 25-27, 2007



Mathematics and Computers in Science and Engineering
A Series of Reference Books and Textbooks

ISSN: 1109-2769
ISBN: 978-960-8457-99-7

FLUID MECHANICS & AERODYNAMICS

Proceedings of the 5th IASME/WSEAS International Conference on FLUID MECHANICS and AERODYNAMICS (FMA'07)

Vouliagmeni, Athens, Greece, August 25-27, 2007

FLUID MECHANICS & AERODYNAMICS

Proceedings of the 5th IASME/WSEAS International Conference on FLUID MECHANICS and AERODYNAMICS (FMA'07)

Vouliagmeni, Athens, Greece, August 25-27, 2007

Published by World Scientific and Engineering Academy and Society Press
http://www.wseas.org

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

ISSN: 1109-2769
ISBN: 978-960-8457-99-7

World Scientific and Engineering Academy and Society

Preface

The book you are currently holding contains the Proceedings of the 5th IASME / WSEAS International Conference on FLUID MECHANICS AND AERODYNAMICS (FMA'07), which was held in Vouliagmeni, Athens, Greece, August 25-27, 2007.

Fluid mechanics and aerodynamics have a history of over two centuries and their necessity continuously increases, as all mechanical parts of machines from the smallest pump in a building or a factory to the main engine of a spacecraft are based on them. Mathematical modeling, simulation, numerical methods, experimental methodologies in fluid mechanics, convection, thin film technologies, multiphase flow, boundary layer flow, material properties, fluid structure interaction, hydro technology, hydrodynamics, coastal and estuarial modeling, wave modeling, industrial applications, air pollution problems, fluid mechanics for civil engineering and geosciences, flow visualization, biofluids, meteorology, hydrology, oceanology, ocean engineering, aircrafts structure and design, aerodynamics for aircrafts, spacecrafts, helicopters, air-turbines, propeller engines, wind generators etc are some of the most important branches of modern fluid mechanics and aerodynamics. Many papers from all these branches are published in this Volume.

The Plenary Speeches of FMA '07 were:

- *Mathematical Modelling: the Interplay among Mathematics and Application Branches*

by Prof. Andris Buikis, University of Latvia, Latvia.

- *Vortex Dynamics in Cardiac Flows*

by Prof. Pavlos P. Vlachos, Virginia Tech, USA.

- *Influence of wall roughness on the slip behavior of viscous fluids*

by Prof. Sarka Necasova, Academy of Sciences, Czech Republic.

- *Numerical Optimization in Hydrodynamic Design*

by Prof. John S. Anagnostopoulos, National Technical University of Athens, Greece.

- *The Fluid Mechanics of the Shaped Charge*

by Prof. John Curtis, QinetiQ, UK.

We would like to thank all members of the organizing laboratories for their contribution to the organization of the conference.

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: www.worldses.org/indexes.

In addition, the papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in these conference proceedings

are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, Compendex, INSPEC, CSA .... see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal).

We cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

The Editors

5th IASME / WSEAS International Conference on FLUID MECHANICS AND AERODYNAMICS (FMA'07)

TABLE OF CONTENTS

Authors Index
FMA 2007