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Advances in Hypersonics

Computing Hypersonic Flows

Volume 3

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Contents

Preface	vi
List of Contributors	ix
Approximate Two Layer (Inviscid/Viscous) Methods to Model Aerothermodynamic Environments <i>Fred R. DeJarnette</i>	1
Second-Order Effects in Hypersonic Boundary Layers <i>B. Aupoix, J. Ph. Brazier, J. Cousteix, F. Monnoyer</i>	21
Unstructured-Grid Algorithms for High-Speed CFD Analysis <i>A. Dervieux, J.-A. Desideri, L. Fezoui, M.-V. Salvetti, M. Mallet, J. Periaux, B. Stoufflet</i>	62
Numerical Simulation of Three-Dimensional Hypersonic Viscous Flows <i>W. Kordulla, B. Müller, S. Riedelbauch, W. Wetzel, C. Brenner</i>	169
Numerical Simulation of Entry Flow over Blunt Swept-Wing Planes <i>C. P. Li</i>	220
Viscous Nonequilibrium Flow Calculations <i>F. Coquel, C. Flament, V. Joly, C. Marmignon</i>	299
The Finite Pointset Method for Hypersonic Flows in the Rarefied Gas Regime <i>H. Neunzert, J. Struckmeier</i>	342
Computation of Flowfields for Hypersonic Flight at High Altitudes <i>James N. Moss</i>	371

Preface

These three volumes entitled *Advances in Hypersonics* contain the Proceedings of the Second and Third Joint US/Europe Short Course in Hypersonics which took place in Colorado Springs and Aachen. The Second Course was organized at the US Air Force Academy, USA in January 1989 and the Third Course at Aachen, Germany in October 1990.

The main idea of these Courses was to present to chemists, computer scientists, engineers, experimentalists, mathematicians, and physicists state of the art lectures in scientific and technical disciplines including mathematical modeling, computational methods, and experimental measurements necessary to define the aerothermodynamic environments for space vehicles such as the US Orbiter or the European Hermes flying at hypersonic speeds.

The subjects can be grouped into the following areas: Physical environments, configuration requirements, propulsion systems (including airbreathing systems), experimental methods for external and internal flow, theoretical and numerical methods. Since hypersonic flight requires highly integrated systems, the Short Courses not only aimed to give in-depth analysis of hypersonic research and technology but also tried to broaden the view of attendees to give them the ability to understand the complex problem of hypersonic flight.

Most of the participants in the Short Courses prepared a document based on their presentation for reproduction in the three volumes. Some authors spent considerable time and energy going well beyond their oral presentation to provide a quality assessment of the state of the art in their area of expertise as of 1989 and 1991.

The development of the Short Courses was a large success due to close cooperation of the following people whose talents cover large and impressive areas in science and engineering, organization, management, and fund raising abilities among others:

Colorado Springs Organizing Committee:

R. Bec (CNES, France); J. J. Bertin (Univ. of Texas at Austin, USA); C. Dujarric (ESA, France); R. Glowinski (Univ. of Houston, USA); R. Graves (NASA, USA); E. Krause (Univ. of Aachen, Germany); S. Lekoudis (ONR, USA); P. Le Tallec (Univ. of Paris

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Aachen Organizing Committee:

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The members of the Organizing Committees would like to address their warmest thanks to those institutions and companies for their support of the programs, in particular AFSOR, AGARD, NATO, CNES, Cray Research, EOARD, ESA, GAMNI, NASA OAST and the ONR for the Colorado Springs Short Course and Dassault Aviation, CNES, Deutsche Aerospace, Deutsche Forschungsgemeinschaft, EOARD, ESA, Fakultät I RWTH, GAMNI MBB, MTU and US Air Force Academy for the Aachen Short Course.

We would like to express our particular thanks to the faculty and staff of the US Air Force Academy who made major contributions to the success of the Second Joint Europe/USA Short Course in Hypersonics; special thanks is due to Col. M. L. Smith and the Aeronautics Department (especially Capt. D. S. Adams and S. Orlofsky) and also USAFA families who provided accommodation to young scientists with the warmest and most generous hospitality, Special

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We also express our gratitude to the faculty and staff of the RWTH University of Aachen who made major contributions to the success of the Third Joint Europe/US Short Course in Hypersonics; special thanks is due to Prof. R. Jeltsch and Prof. Krause from Fakultät I Mathematik and Aerodynamics Institute respectively for their outstanding contributions to the success of the Course. Special thanks is also due Dr. K. H. Brakhage for his help and assistance in the preparation of the Course. He carried out this difficult organizational task with enthusiasm and professional care.

The editors would like to thank the staff of Birkhäuser and Sylviane Gosset for their help and patience with us during the processing of the full manuscript.

We hope that these volumes will be used frequently as a classic reference in the years to come.

John J. Bertin
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July 1992

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