

Foreword

This volume contains articles resulting from research projects initiated during the CEMRACS 2005 entitled **Computational Aeroacoustics and Computational Fluid Dynamics in Turbulent Flows**.

The CEMRACS is an annual summer school promoted by the SMAI (French Society of Applied and Industrial Mathematics), whose goal is to create and reinforce interdisciplinary collaborations between applied mathematicians and scientists of other fields from academia and industry. This CEMRACS was devoted to two closely linked topics : turbulent flows and noise generation within the framework of computational aeroacoustics (CAA) and more generally computational fluid dynamics (CFD). The interest was to gather most of the participants of the DFG¹-CNRS² research groups “Noise generation in turbulent flows” and “Large eddy simulation (LES) of complex flows”. These groups are composed of sub-projects, each of them implying French and German researchers. All the organizers were members of these groups and most of the participants to this CEMRACS also.

The CEMRACS 2005 took place from the 18th of July to the 26th of August 2005 at the CIRM (Centre International de Rencontres Mathématiques, Marseille, France). It consisted of three events:

- Euromech Colloquium no. 467 on turbulent flow and noise generation (July 18 - July 20)
- a summer school on computational aeroacoustics (July 21 - July 25)
 - Pierre Comte (Institut de Mécanique des Fluides et des Solides, Strasbourg, France) - Vortex dynamics and compressibility effects in Large-Eddy Simulation.
 - Bruno Desprès (CEA-DAM, Bruyères-le-Châtel, France) - Numerical methods in Lagrangian fluid dynamics.
 - Fang Q. Hu (Old Dominion University, USA) - A survey of numerical methods for CAA.
 - Wolfgang Schröder (Aerodynamisches Institut, Aachen, Germany) - Computational aeroacoustics based on hybrid approaches.
 - Young J. Moon (Korea University, Korea) - Computational aeroacoustics for low Mach number flows.
 - Christine Bernardi (Université Paris VI, France) - A posteriori analysis for mesh and other adaptations.
- a research center (July 25 - August 26)

From July 25, after a daily morning seminar, the participants worked in teams on more than 20 projects sponsored by public research or industry funds. The CEMRACS 2005 has been attended by about 100 researchers, whose half were students. Each team was composed of young French and German researchers assisted by one or more senior researchers. It has received the label “European Summer University” delivered by the French government.

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¹Deutsche Forschungsgemeinschaft

²Centre National de la Recherche Scientifique