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Foreword for the special issue on 'Large Eddy Simulation, Coherent Vortex Simulation & Vortex Methods' dedicated to the memory of Joel Ferziger

This special issue is dedicated to the memory of Joel Ferziger who died on 16 August 2004. It contains 11 papers which were presented during the Euromech Colloquium 454 on 'Large Eddy Simulation, Coherent Vortex Simulation and Vortex Methods' that Joel Ferziger, Kai Schneider and Marie Farge have organised at CIRM (Centre International de Rencontres Mathématiques) in Marseilles (France) from 14 to 16 April 2004.

The colloquium focused on the most recent methods for the numerical simulation of turbulent flows: large eddy simulation (LES) vortex methods, coherent vortex simulation (CVS), introduced in the 1970s, 1980s and 1990s, respectively. These three approaches, independently developed from different principles are currently getting closer, from both conceptual and practical points of view. The main objectives of this colloquium were to check how close they are today, assessing similarities and differences, present new developments and results and define benchmarks for quantitative comparison. These goals were stated in the text that Joel Ferziger sent us and which was read as the opening address of the colloquium, since unfortunately his health did not allow him to come to Marseilles. Here is what Joel wrote:

> Each of you works in one of the three major areas of the title of the conference. We each have reasons for preferring our approach. Otherwise, we wouldn't be following it and would be doing something else. Experience has shown that each approach is best suited to some particular types of problem. This is definitely the case with the methods covered in this conference. Delineating and expressing the range of usefulness and limitations of each method (to the extent that we know them) would be a very useful and important function of this conference. This is best accomplished by discussions between people that favor the various approaches. It is therefore my hope that each of you will spend considerable time talking to people that use methods other than your own in addition to the time that you will naturally devote to detailed discussions with people who work in your own area. It would be a major contribution if the conference produces a document that compares and contrasts the various methods.

Short biography of Joel Ferziger

Joel Ferziger was born on 24 March, 1937 in Brooklyn, New York. He became faculty member of the Stanford University at the age of 24. At his retirement party in June 2004 he said: "This has been my dream job for 43 years, I cannot imagine wanting to do anything else. If I were independently wealthy, I probably would have done it for free".

Joel considered himself to be a "numerical experimentalist". With William C. Reynolds he was among the pioneers of the LES method, which made computations of turbulent flows at large Reynolds numbers possible.

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Joel Ferziger published more than 100 journal articles and 4 textbooks:

Ferziger, J.H. and Zweifel, P.F., 1966, *The Theory of Neutron Slowing Down in Nuclear Reactors* (Amsterdam: Elsevier).
Ferziger, J.H. and Kaper H.G., 1972, *Mathematical Theory of Transport Processes in Gases* (Amsterdam: North Holland).
Ferziger, J.H., 1982, *Numerical Methods for Engineering Application* 1st edition (New York: John Wiley & Sons). (2nd edition, 1998).
Ferziger, J.H. and Peric, M., 1996, *Computational Methods for Fluid Dynamics* 1st edition (Berlin: Springer). (2nd edition 1999, 3rd edition, 2004).

'Thank you Joel'

Thank you for all what you have taught us concerning physics, engineering, CFD and, above all, life! You had such a talent to combine them all, enjoying good life and good science at the same time. We and our colleagues in CFD miss you badly. You were among the few who mastered all aspects of this new and broadband discipline, which is experimental although it solves equations based on theory, which is applied although it gives hints to deep mathematical problems, such as the existence and uniqueness of Navier-Stokes' solutions. We dedicate you this set of papers presented during the workshop on 'LES, CVS and vortex methods to study turbulence' that we have organized together in Marseilles, from April 14th to 16th 2004.

The idea sparkled around a good bottle of wine we shared together, but we do not remember where and when, since we were meeting you many times, either in Palo Alto, Paris or Marseilles. Our guide line was to gather a group of friends to discuss new ideas and exchange new tricks concerning the dreadful and still open problem of turbulence computation and modeling, topics for which you were both a pioneer and a leader. We prepared everything together, but unfortunately you could not attend the workshop because doctors were trying their best to help you fighting cancer. Three months later, at the beginning of July, we had the great pleasure to see you again in Paris and to share a last bottle with you, a gorgious red wine from Bandol grown a few kilometers from Marseilles (see photo below). Although you were very lucid concerning your cancer, your taste for life was intact and we had a lot of fun together.

Now you are gone, your example remains with us as a source of inspiration for our own lives.

Marie Farge and Kai Schneider,
Marseilles, 3 October 2005

Figure 1. Our last lunch together in Paris on 1 July 2004. From left to right: Joel Ferziger, Marie Farge and Kai Schneider. The photograph was taken by Eva Ferziger.