

Preface

The second Summer Program of the Center for Turbulence Research was held during the four week period June 27-July 22, 1988. As in the summer of 1987 the program focused on the use of direct numerical simulations of turbulent flows for study of turbulence physics and modeling. The main differences were the absence of distinct thematic groups, and a special emphasis on turbulent mixing layers; about a third of the research projects were concerned with turbulent mixing layers. The required data for these investigations were generated from four newly developed codes for simulation of time and spatially developing incompressible and compressible mixing layers.

The remaining projects covered a wide range of topics in turbulence research. These included, the structure of wall bounded turbulent and transitional flows, evaluation of diagnostic techniques for detection of organized motions, energy transfer in isotropic turbulence, optical propagation through turbulent media, and detailed analysis of the interaction of vortical structures. Some of these projects were a continuation of the efforts started in the 1987 Summer Program. A significant fraction of the research conducted during the Summer program used new simulations rather than existing databases. This allowed exploration of different parameter regimes and boundary conditions.

As part of the program, four review tutorials were given on topics related to turbulent mixing: Convective and absolute instability (P. Huerre), Concepts for mixing layer control (C. M. Ho), Dynamical systems and mixing (J. Ottino), Mixing and Chemical reactions (J. C. Hill). There were also four special lectures on recent numerical simulations and databases.

This volume begins with the nine papers on turbulent mixing layers arranged in alphabetical order by the first author followed by the remaining papers also arranged in alphabetical order. The volume is an account of a short but intense period of research activity; therefore, the results should be considered as preliminary. Many of the studies that began during the summer are being continued, and it is hoped that in due course the results will be submitted to the appropriate journals by the authors. Early reporting of virtually all of the projects occurred at the Forty-First Meeting of the Fluid Dynamics Division of the American Physical Society in Buffalo, New York, November 20-22, 1988. Twenty two abstracts based on the work accomplished during the summer program were presented at this meeting.

Parviz Moin
William C. Reynolds
John Kim