A common criticism towards this community is that it focuses on ideal ‘infinite’ Reynolds number and isotropic turbulence, leaving aside ‘real word’ flows which are known to be anisotropic to a large extend. Interestingly, the book prescrits several experimental indications that the cascade properties and intermittency should be related by a way or another to the mean shear (paper by Cililberto et al. cited above and “On the origin of intermittency in real turbulent flows” by Khomyanski and Tsinober). One of the conclusions given by the editor in its introduction is that “we must be prepared to do away with the concept of universal turbulence...”. This sounds like the status of the turbulence modeling community which has abandoned any desire for a universal turbulence model after several decades of great efforts. On the same line of thinking, the first article of the book is a contribution by Blossey and Lumley on “Control of intermittency in near-wall turbulent flows”. This article describes ongoing works on drag reduction by means of control in a closed-loop of the near wall intermittent busting process using low order proper orthogonal decomposition (POD). This is a challenging topic in the field of applied fluid mechanics but it sharply departs from the spirit of the whole. Opening the book with such a topic is felt as an indication that cross-fertilization of ideas coming from all domains in the field of turbulence is becoming crucial to be able to go ahead.

It is in this spirit that I will recommend, finally, the reading of this book to people involved in the field of turbulence research, both physicists and modelers. It describes an interesting body of recent research results that draw bounds to our sparse knowledge about turbulence theory. Its reading may motivate, hopefully, novel research ideas which are strongly needed in the domain of turbulent flows.

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Lattice Gas Hydrodynamics by Jean-Pierre Rivet, Jean Pierre Boon (Cambridge University Press (Cambridge Non-linear Science Series), UK, 2001, 289 pp.) £60.00, US$ 95.00 hardcover. ISBN 0 521 41944 1

When the lattice gas cellular automaton was introduced as an entirely new and simple way to compute hydrodynamic flows in the mid-1980s, it gave rise both to an intense research activity and a whole cascade of related models. The present book deals with the basic theory of these models.

As the lattice gas automaton models the physical fluid as a collection of discrete, interacting particles it has both hydrodynamic average properties and fluctuations. This is a key focus in the book. Along with the hydrodynamic continuum limit the book describes how the fluctuations that arise in lattice gases have physical characteristics.

This excellent book systematically develops lattice gas theory, starting from the microscopic evolution equations and properties of the underlying lattice. In this way the reader is introduced not only to the theory of a particular model, but to the whole hierarchy of models that emerge from the basic ideas of conservation laws and lattice symmetries. These models range from the original anisotropic lattice gases to thermal- and multi-species lattice gases.

From this starting point macroscopic consequences are worked out along two main routes: First, the hydrodynamic equations, in particular the Navier–Stokes equation, are worked out using the lattice gas version of the Chapman Enskog expansions. Second, the hydrodynamic equations are derived through projection operators and Green–Kubo relations. The latter approach produces in particular the correlations (spectra) of the density fluctuations.

A typical feature of this book (and for natural reasons, most other books of this kind) is that its focus reflects the research done by the authors. The book thus focuses on the fundamental statistical mechanical nature of lattice gases, their Green–Kubo relations and both thermal and non-thermal fluctuations.

The theory is clear, pedagogical and follows a natural line of development. Some of the chapters are specific to lattice gases while others give good introductions to established subjects like basic statistical mechanics, hydrodynamic linear response theory and projection operator techniques. The theoretical results, in particular for the fluctuation power spectra, are compared with simulation results throughout. There is also a chapter on applications that describes special purpose cellular automata computers, and large scale simulations of hydrodynamic instabilities as well as the data post-processing.

This book does not include many of the lattice gas extensions to fluids more complex than thermal ones. There is no treatment of lattice gases with surface tension, colloidal particles or surfactants, nor are the lattice Boltzmann models treated. Partly for these reasons this book very nicely complements the book *Lattice gas Cellular Automata* by Rothman and Zaleski, which leans more towards applications to complex flows. However, in the last chapter there is an excellent short review of the literature on the models that have evolved from the basic lattice gas models. This review includes the applications to complex fluids.

Who should read this book?

For graduate students entering into the subject area of lattice gases or related methods this book would be an excellent starting point. But also for experts in related fields of fluid dynamics and statistical physics will this book serve as a very good introduction. Finally, to the community of researchers in in the field of lattice gas/lattice Boltzmann techniques the book by Rivet and Boon will be a valuable reference for the basic, and also not so basic, theory of the field.

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Wave Motion*: *Theory and Application by J. Billingham, A.C. King (Cambridge University Press, UK, 2001, 468 pp.) £24.95, US$ 37.95 paperback. ISBN 0 521 63450 4

Wave motion occurs in many applications in the sciences and everyday life. Examples include waves on a beach, waves on the stretched strings of a guitar, sound waves, electromagnetic waves, chemical waves and traffic waves. This book provides an excellent advanced introduction to the mathematical theory of wave motion. It is ideally suited to advanced undergraduate students and beginning postgraduate students. Moreover, mathematicians, physicists and engineers will find interest in the most advanced topics.