

and linearization. In the end of the book, mixtures, polyatomic gases, and evaporation/condensation phenomena are discussed. There is also a specific chapter for practical aspects of the Direct Simulation Monte Carlo method – but numerical results are discussed throughout the whole book. The author has put a lot of emphasis on several important points which he knows particularly well: for instance gas-surface interaction (on many occasions he demonstrates that the simplest reflection boundary conditions are quite unrealistic), modelling of mixtures, boundary layers.

Now for the missing topics: as acknowledged by the author, the most ‘famous’ absent in the book is the kinetic theory of plasma physics. Nothing is said either about kinetic descriptions of quantum phenomena (but this area is still in construction). Thus the discussion is confined to ‘classical’ mechanics in the strong sense.

Who should consult this book with profit? Everybody interested in modelling or simulations of rarefied flows (researchers, engineers, experimentalists, . . .). In addition to acquainting them with the basic notions for a number of situations, this book will orientate them very efficiently through a vast literature. The book is very well-suited for students in fluid mechanics (e.g. in aeronautics, but not necessarily, since it requires no prior knowledge about kinetic theory). Specialists of Navier–Stokes may be interested in the discussion of non-applicability of their favorite equation. Finally, specialists of theoretical questions in kinetic theory may be curious about the practical use and applicability of the Boltzmann equation.

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S0997-7546(00)01118-3/BRV

An Engineering Approach to the Calculation of Aerodynamic Flows by Tuncer Cebeci with the aeronautical industry, mainly McDonnell Douglas (Springer-Verlag, Heidelberg, Germany, 1999, 396 pp.) DM 159; öS 1161; sFr 144; FF 599; £ 61; US\$ 96 hardcover ISBN 3-540-66181-6

For some of the techniques a listing of a Fortran computer program is also given.

In the first part, the complete set of calculation methods for airfoils in incompressible flows is well outlined, including the effect of separation bubbles. This part is well documented with computer programs and is a very useful basis for any student or young engineer approaching the problem of airfoils from the numerical point of view.

Going to more complex problems, such as transonic flows and three-dimensional bodies, the formulation of the problem is not always as complete as in the first parts of the book, but it is, in any case, a very good guide to the problems.

Very interesting is the last part, covering some applications: it is not a complete overview of the application of computer programs to the solution of aeronautical fluid dynamics, but a set of cases that seems to have been encountered in a real professional career, and therefore are a summary of working experience more than an academic essay.

The theoretical aspects and the mathematical formulation of all the problems is clear, accurate and carefully explained in the assumptions and approximations made, so that the treatment is rigorous from the formal point of view and may not induce any misunderstanding as sometimes happens in ‘engineering’ books.

The physical explanation of the described phenomena is very clear and correctly placed to introduce the subjects, so that the reader is led into the different topics having at first a clear idea of what really happens. It helps in understanding further mathematical problems, even if they are rather complex. The explanations are illustrated with many simple and clear figures, which support both the mathematical treatment and the physical understanding.

A set of references is wide and almost complete, although not too large to confuse the reader.

An experiment to ask some students to make use of the panel program has shown that it was rather simple to use the programs by course students. This is clearly a good result.

The overall impression is one of a very good support either to students or to young engineers approaching the problem of practical calculations of aeronautical flows.

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