Book Review

An Introduction to Theoretical and Computational Aerodynamics, by Jack Moran, John Wiley and Sons, New York, 1984, 464 pp., $39.95.

When this book became available in the fall of 1984, my colleagues and I were engaged in developing an elective, senior-level topical course in aerodynamics which included some segments designed for computer-oriented problem sets. Some (but not all) of the background topical material was covered in the book, so we decided to give it a try as one of the texts. We were intrigued by what appeared to us to be a certain clarity of style, enhanced by a refreshing informality used effectively by the author throughout, and wanted to see how a small group of motivated students would react to the book. As it turned out, the book probably performed better than this early version of our experimental course. In brief, the students enjoyed using "Moran."

Partly as a result of this experience, I decided to specify Professor Moran's work as one of the two required texts for our junior-level subject in aerodynamics for the 1985 fall semester. This is a high-intensity *required* course comprising 50-plus lectures and 10-11 problem sets of about four examples each, therefore, the students appreciate any help they can get from the text(s). The course has a couple of prerequisites, using other texts. Although very few specific reading assignments are given, after a topic is introduced by lecture or handout, the students are encouraged to read about the subject in one of their books. By no means is all of the material of the course covered as extensively as one might like in this edition, but the indexing is good, material is quickly located, and further references are adequate. Again, most of the students found "Moran" helpful for specific topical information, and many commented favorably on the clear style of presentation.

To use this book effectively for teaching purposes, it is helpful to read the Preface. The book exists as a compendium of the author's notes used in courses at the University of Minnesota, which are *part* of a particular sequence on fluid mechanics at that school. Using this edition as a text, by itself, for a course which is a different part of a different sequence will require careful planning, combined with other sources of basic fluid mechanics material. As the author himself points out, knowledge of the underlying thermodynamic principles is assumed. Moreover, the energy conservation equation, though recorded, is not really discussed; heat transfer and recovery factor are not mentioned in the context of modern aerodynamic applications. In fact, the Prandtl Number does not appear. Understanding this, it seems best to use the book as an *adjunct* text, depending on the application, complemented by additional notes and/or other books. I had some success with this procedure, and, in view of the favorable "reviews" from our students, perhaps Professor Moran will be encouraged to add a chapter or two in his next edition.

A significant aspect of this volume is the presence of well-documented FORTRAN programs written for certain fundamental aerodynamic applications and for learning purposes. It is important that these are present, not so much because they will be used directly by everyone—people tend to write their own programs—but because they emphasize the importance of the computational aspect of modern aerodynamics and the need for its inclusion in up-to-date teaching of the subject. It seems to this reviewer that a good balance has been struck, particularly at the undergraduate level, between classical ("Prandtl-type") aerodynamics and its current implementations via the computer.

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