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BOOK REVIEWS

I. POP, **Theory of Unsteady Laminar Boundary Layer Flow,** Editura Stiintifica si Enciclopedica, Bucharest, 1983, 333 pp.

PROFESSOR Pop's new book is an important achievement that deserves the attention of the heat transfer and fluid mechanics communities. It is not only a highly scholarly piece of writing, but also a very timely reminder that the study of unsteady flows has finally reached the status of self-standing subfield in fluid mechanics and heat transfer research.

The growing interest in unsteady flows and their heat transfer applications is a phenomenon rooted into a long list of contemporary engineering problems, for example, the pulsating blood flows in capillary vessels, the pulsating flows in both centrifugal and reciprocating engines and compressors, the take-off and landing of aircraft, unstable multiphase flows, etc. The growth of this subfield is illustrated very well by the organization of Professor Pop's monograph and by the 355 references on which the monograph is based. The book is divided into six chapters:

1. Unsteady stagnation flows.
2. Unsteady boundary layer flow near a semi-infinite plate.
3. Unsteady flow near a circular cylinder.
4. Unsteady separation.
5. Unsteady thermal boundary layers (near stagnation points, flat plate, circular cylinder).
6. Unsteady compressible boundary layer flow.

Each segment of the book is characterized by a balance between mathematical analysis and physical description, and between methods and results. This book was written by a teacher, and for this reason it can be used effectively as supplementary material in the teaching of boundary layer methodology. The writing style used in this book is also very appealing, starting with a rare and highly-detailed historical account of the history of boundary layer thinking.

I recommend this book to anyone interested in boundary layer theory and in a contemporary direction in the development of this theory.

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E. E. KHALIL, **Modelling of Furnaces and Combustors.** Abacus Press, 1982, 260 pp.

MODELLING is now an essential tool in the design of modern furnace and combustion equipment. Its application can lead to improved furnace efficiency, reduction in plant costs, reduction in pollutants, prolonged plant life etc. An up-to-date summary of modelling techniques available to designers is long overdue, so that the present volume appeared from its title to fill a large void. Regrettably, and perhaps foreseeably, this book does not set out to meet the implications of its title. It is in fact an assembly of the work undertaken by the author and his co-workers at Imperial College London, to solve the partial differential equations governing turbulent flow in the presence of combustion and heat transfer. With chapters on turbulence models, single phase combustion, two phase combustion, heat transfer and pollution, and numerical techniques and solution procedures, it is an invaluable guide to the intricacies of this modelling approach developed over many years. Particularly welcome are the extensive comparisons between computer predictions and experimental measurements, although it would have been good to see more comparisons with full-scale industrial plant in addition to the work on experimental rigs considered. Inevitably, by bringing together in one volume the contents of the many papers published by the author at different times, the book draws attention to the fact that the same experimental data is often used to prove different points in different chapters, so that I was left wondering how the choice of say a different turbulence model might affect the subsequent choice of kinetic model or heat transfer model in later chapters.

For anyone who wishes to come to grips with the author's modelling technique, this book, with its extensive and well arranged reference sections, must be essential reading. However, despite the somewhat naïve description of furnace and combusting flows in the first chapter, the remainder of the book presumes the reader to be very familiar with the use and manipulation of partial differential equations to describe these phenomena, and anyone who, like, me, does not have the required fluency, will find this volume heavy going.

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