Book Review

Gordon C. Oates, *Aerothermodynamics of Gas Turbine and Rocket Propulsion,* American Institute of Aeronautics and Astronautics, Inc., New York, 1984, xii + 412 pp., $45.00

This book is a suitable text for an undergraduate or first-year graduate course that covers gas turbine and rocket propulsion. Eight of the book's eleven chapters deal with subject areas that are identical to those areas covered by other propulsion textbooks, including basic thermodynamics, ideal and nonideal Brayton cycles, thrust, fuel consumption, and rotating blade analysis. The remaining three chapters cover off-design analysis, blade throughflow theory, and simple cascade-flow calculations.

Because other propulsion textbooks are well established and widely used, some improvements offered by this new text are noted. The book has many example problems with solutions, as well as ten to twenty homework problems following each chapter. Example problems are treated as if the reader is a designer who knows the value of certain input parameters but wishes to calculate output parameters for a given set of constraints. The use of the metric system is an improvement, and a section describing the conversion from metric to English units is included. The two chapters on blade throughflow and cascade analysis are useful because they describe simple methods that a designer would use to estimate compressor and turbine performance.

However, this reviewer's opinion is that any improvements due to the emphasis on design calculations are counterbalanced by a number of deficiencies. The fundamental concepts of propulsion are described adequately, but with somewhat less insight, depth, and logic than found in some excellent older textbooks. Description of the actual engine hardware is essential in an introductory text, yet this book omits most of the physical description of engine components. Surprisingly, there are no photographic reproductions of engine components; only simple schematics are included. Graphic displays of performance parameters are an important teaching aid, but most of the graphs in the book are not of high quality. The graphs are labeled with symbols only (in many cases Greek symbols only) instead of easily identified words; the figure captions are too brief, in general. There are no details describing modern advances such as turbine-blade cooling, blade material, new fuels and fuel nozzles, propfans, variable area nozzles, etc.

Because this textbook includes example problems, design criteria, and convenient lists of the relevant equations, it should be of value to those instructors who wish to add some principles of design to an introductory propulsion course.

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