

acoustics education in the US. Now they have some competition.

The three are *Fundamentals of Acoustics* by Lawrence Kinsler, Austin Frey, Alan Coppens, and James Sanders (Wiley, 3rd edition, 1982); *Acoustics: An Introduction to Its Physical Principles and Applications* by Alan Pierce (Acoustical Society of America, 1989); and *Theoretical Acoustics* by Philip Morse and Karl Uno Ingard (Princeton U. P., 1968). Each has its advantages and shortcomings. When I teach a two-semester, graduate-level sequence of courses in acoustics at Pennsylvania State University, I usually pull material from all three.

The new book by Paul Filippi, Dominique Habault, Jean-Pierre Lefebvre, and Aimé Bergassoli is an important contribution. Their *Acoustics: Basic Physics, Theory, and Methods* is not a rehash of material from the three popular texts mentioned above. Much of the material has been selected from alternate sources, and several fresh approaches are provided from the work of the authors themselves: the book was derived from a six-month course in acoustics for graduate students that the authors taught at the University of Aix-Marseille in France. (Their lecture notes in French were published by the French Acoustical Society and the Editions de Physique in 1994; they were later translated into English at the urging of Philip Doak of the University of Southampton, in the UK.)

Unlike many books in acoustics, the new *Acoustics* does not attempt to be exhaustive in covering all subdisciplines of the field. Rather, it focuses on teaching the basic analytical tools required for advanced analysis. For example, the radiation from the baffled circular piston is not covered, but a piston at one end of a duct and in the wall of a duct is. Likewise, the transversely oscillating sphere is not covered, but the infinite fluid-loaded thin plate is. The book's sections on enclosures and ducts with absorbing walls are very thorough and readable; by contrast, many acoustics monographs discuss the effects of impedance coatings on modal decomposition only qualitatively.

In the tradition of graduate education in France, a high level of mathematical sophistication is assumed, and this approach pays many dividends. The techniques that can thereby be introduced include boundary integral equations, layer potentials, geometrical theory of diffraction, the parabolic approximation, method of stationary phase, method of steepest descents, WKB approximation, Wei-

ner-Hopf approaches, and Galerkin's method. The presentations are extremely clear and accessible. Chapter 1, on the physical basis of acoustics, may seem daunting to the casual reader because of its mathematical rigor. Those already familiar with acoustics, however, will probably want to dive directly into the later chapters: enclosures; diffraction and boundary integral equations; outdoor sound propagation; analytic expansions and approximations; boundary integral equations; guided waves; and transmission and radiation of sound by thin plates. An additional chapter gives homework problems for the earlier chapters, and the book concludes with a section on mathematical notations and definitions. At only one and one-quarter pages, the index is terse.

The book does have a few drawbacks worth noting. There are some misprints (two of the more obvious ones are in equations 1.5 and 2.7). An attempt was made to provide cross-references between chapters, but notations often differ: for example, chapter 1 uses " σ " for stress tensor while chapter 2 uses " σ " for the domain boundary. Several concepts are repeated; for example, the Delany-Bazely model for the specific impedance of a porous medium. I hope that in a future revision, such minor annoyances will be eliminated, since this book provides a useful advanced survey in acoustics.

Overall, I liked the book, and I surely would recommend it for the library of anyone involved in advanced acoustics. I will not use the book as a text in any class but will instead use it as source material.

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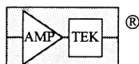


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