Finite Element and Boundary Methods in Structural Acoustics and Vibration
Noureddine Atalla and Franck Sgard, CRC Press, (2015), 470 pp., 169.95 USD, ISBN-13: 978-1466592872

The authors present the finite element method (FEM) and the boundary element method (BEM) in a methodical manner that allows the reader to attain a deep understanding of the various aspects of these methods and the constraints.

The contents:

1. Introduction
2. Basic equations of structural acoustics and vibration
3. Integral formulations of the problem of structural acoustics and vibrations
4. The finite element method: An introduction
5. Solving uncoupled structural acoustics and vibration problems using the finite element method
6. Interior structural acoustic coupling
7. Solving structural acoustics and vibration problems using the boundary element method
8. Problem of exterior coupling

The book ends with a list of symbols and index.

Finite Element and Boundary Methods in Structural Acoustics and Vibration begins with presenting the equations for the solution sets to examples that serve as the fundamental foundation for most applications and builds on those. For the undergraduate wrestling with the concepts for the first time, there are simple drawings that help clarify the example and the method of obtaining the solution. The chapters are clearly labeled as to the area of its focus and end goal to be achieved, so the more experienced reader can advance to the more complex subject content. The book also includes the computer program code for many examples to further guide the reader to a successful understanding and usage of the principles and analysis of the FEM and BEM.

The approach serves well for researchers of all levels in vibro-acoustics, since the examples provided cover a full spectrum of applications, as well as coupling the examples with the constraints and convergence aspects of FEM that often cause the user to not use the FEM successfully. A complete understanding of the limitations and advantages of FEM/BEM, as well as insight into the direct vs. indirect method, is crucial in any effective FEM/BEM application.

This book is effective in weaving those discussions into the examples in order to facilitate a successful application of the FEM/BEM and, therefore, recommended.

Bonnie Schnitta
SoundSense, Wainscott NY, USA
Bonnie@SoundSense.com