

# Acoustic Analyses Using **MATLAB<sup>®</sup>** and **ANSYS<sup>®</sup>**

Carl Q. Howard and Benjamin S. Cazzolato



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using the developed translation code As a large scale and practical application a wind turbine model is also used to study the noise propagation on the ground due to the vibration of the turbine structure and the rotation of turbine blades It is found that the coupled analysis with the FEM and BEM can model the noise prediction of large scale structures effectively and efficiently

**Engineering Vibroacoustic Analysis** Stephen A. Hambric, Shung H. Sung, Donald J. Nefske, 2016-02-18 The book describes analytical methods based primarily on classical modal synthesis the Finite Element Method FEM Boundary Element Method BEM Statistical Energy Analysis SEA Energy Finite Element Analysis EFEA Hybrid Methods FEM SEA and Transfer Path Analysis and Wave Based Methods The book also includes procedures for designing noise and vibration control treatments optimizing structures for reduced vibration and noise and estimating the uncertainties in analysis results Written by several well known authors each chapter includes theoretical formulations along with practical applications to actual structural acoustic systems Readers will learn how to use vibroacoustic analysis methods in product design and development how to perform transient frequency deterministic and random and statistical vibroacoustic analyses and how to choose appropriate structural and acoustic computational methods for their applications The book can be used as a general reference for practicing engineers or as a text for a technical short course or graduate course

*Control of Noise and Structural Vibration* Qibo Mao, Stanislaw Pietrzko, 2013-06-02 Control of Noise and Structural Vibration presents a MATLAB based approach to solving the problems of undesirable noise generation and transmission by structures and of undesirable vibration within structures in response to environmental or operational forces The fundamentals of acoustics vibration and coupling between vibrating structures and the sound fields they generate are introduced including a discussion of the finite element method for vibration analysis Following this the treatment of sound and vibration control begins illustrated by example systems such as beams plates and double walls Sensor and actuator placement is explained as is the idea of modal sensor actuators The design of appropriate feedback systems includes consideration of basic stability criteria and robust active structural acoustic control Positive position feedback PPF and multimode control are also described in the context of loudspeaker duct and loudspeaker microphone models The design of various components is detailed including the analog circuit for PPF adaptive semi active Helmholtz resonators and shunt piezoelectric circuits for noise and vibration suppression The text makes extensive use of MATLAB examples and these can be simulated using files available for download from the book s webpage at [springer.com](http://springer.com) End of chapter exercises will help readers to assimilate the material as they progress through the book Control of Noise and Structural Vibration will be of considerable interest to the student of vibration and noise control and also to academic researchers working in the field It s tutorial features will help practitioners who wish to update their knowledge with self study

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