Virtual Experiments in Mechanical Vibrations: Structural Dynamics and Signal Processing
Michael J. Brennan, Bin Tang

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**DESCRIPTION**

**VIRTUAL EXPERIMENTS in MECHANICAL VIBRATIONS**

The first book of its kind to explain fundamental concepts in both vibrations and signal processing using MATLAB virtual experiments

Students and young engineers with a strong grounding in engineering theory often lack the practical skills and knowledge required to carry out experimental work in the laboratory. Fundamental and time-consuming errors can be avoided with the appropriate training and a solid understanding of basic concepts in vibrations and/or signal processing, which are critical to testing new designs.

*Virtual Experiments in Mechanical Vibrations: Structural Dynamics and Signal Processing* is designed for readers with limited knowledge of vibrations and signal processing. The intention is to help them relate vibration theory to measurements carried out in the laboratory. With a hands-on approach that emphasizes physics rather than mathematics, this practical resource explains fundamental concepts in vibrations and signal processing. It uses the concept of a virtual experiment together with MATLAB to show how the dynamic properties of vibration isolators can be determined, how vibration absorbers can be designed, and how they perform on distributed parameter structures.

Readers will find that this text:

- Allows the concepts of experimental work to be discussed and simulated in the classroom using a physics-based approach
• Presents computational virtual experiments using MATLAB examples to determine the dynamic behaviour of several common dynamic systems

• Explains the rationale of virtual experimentation and describes typical vibration testing setups

• Introduces the signal processing tools needed to determine the frequency response of a system from input and output data

• Includes access to a companion website containing MATLAB code

*Virtual Experiments in Mechanical Vibrations: Structural Dynamics and Signal Processing* is a must-have resource for researchers, mechanical engineers, and advanced undergraduate and graduate students who are new to the subjects of vibrations, signal processing, and vibration testing. It is also an invaluable tool for universities where the possibilities of doing experimental work are limited.

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**ABOUT THE AUTHOR**

**Michael J. Brennan** is a former professor in the Department of Mechanical Engineering, São Paulo State University, Brazil, and also in the Institute of Sound and Vibration Research, University of Southampton, UK. He has extensive experience in teaching, research, and consulting in vibrations and signal processing. He has authored or co-authored more than 225 journal papers and approximately 220 conference papers.

**Bin Tang** is a professor in the School of Energy and Power Engineering, Dalian University of Technology, China. He is the author of more than 60 publications in national and international journals, including *Journal of Sound and Vibration, Applied Mechanics Reviews, and Soft Robotics*

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