applied sciences

MDPI

*Editorial*

# Special Issue on the Application of Active Noise and Vibration Control

**Yijing Chu [1,*], Ming Wu [2] and Hongling Sun [2]**

[1] State Key Laboratory of Subtropical Building Science, South China University of Technology, Guangzhou 510641, China
[2] Key Laboratory of Noise and Vibration Research, Institute of Acoustics, Chinese Academy of Sciences, Beijing 100190, China
* Correspondence: chuyj@scut.edu.cn

Active noise and vibration control aims at attenuating unwanted sound or vibration by automatically generating an anti-sound or vibration. The theories and methods of active control have been raised and studied for almost 40 years. However, there are many problems related to applying these techniques in acoustic applications. Thus, this research field continues to attract the attention of a number of researchers and technicians from different scientific disciplines working with industrial machinery.

This Special Issue aimed to present recent developments in the applications of active noise and vibration control, which includes general topics in active noise control (ANC) and active vibration control (AVC), active structural acoustic control, modelling and simulation of ANC and AVC systems, experimental and implementation techniques for ANC and AVC, and signal processing algorithms for ANC and AVC.

A total of fourteen submissions have been received, and seven papers (six research papers and one review paper) in a variety of research fields of active control technology are presented in this Special Issue. We would like to thank all the authors who accepted our invitation and shared their excellent work with a wide circle of readers via this open-access journal. The papers published in this issue have been peer-reviewed by independent experts, and their help is sincerely appreciated. The topics discussed in the issue are announced as follows. Chen et al. [1] reported a robust active headrest system using virtual microphones to combat the movement and rotation of a human head. Both simulations and experiments were conducted to validate the effectiveness of the proposed method. Zhou et al. [2] reported a novel air suspension system for vehicles to transmit torque and force between wheels and frames, where the proposed cooperative mode predictive control was used for computing the best force. An on-road test verified that the RMS reduction of cooperative control outperforms conventional methods. An et al. [3] proposed a narrowband active noise control system to suppress the flow-induced resonance noise in cavities and experiments were carried out in a duct built up at low Mach numbers. Han et al. [4] used the finite element method and the electro-mechanical-acoustic analogy method to study the low-frequency noise control in an adjustable Helmholtz resonator. An et al. [5] presented a feedback controller design for active noise control headphones when large frequency response mismatches exist. Experiments using a dummy head showed good noise reduction performance under reference frequency mismatch environments. Wu et al. [6] proposed a Genetic K-means clustering linear quadratic algorithm for multi-mode active suspension control that saves expert experience for user parameter selection. Chu et al. [7] identified and compared several multichannel active noise control strategies in some practical acoustic designs.

check for updates

**Citation:** Chu, Y.; Wu, M.; Sun, H. Special Issue on the Application of Active Noise and Vibration Control. *Appl. Sci.* **2023**, *13*, 374. https://doi.org/10.3390/app13010374

Received: 5 December 2022
Accepted: 24 December 2022
Published: 28 December 2022

**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

**Acknowledgments:** We appreciate all the authors and peer reviewers for their valuable contributions to this Special Issue 'Application of Active Noise and Vibration Control'. We would also like to express our gratitude to all the staff and people involved in this Special Issue. Finally, special thanks to the editor who has helped us with publishing this Special Issue.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Chen, H.; Huang, X.; Zou, H.; Lu, J. Research on the Robustness of Active Headrest with Virtual Microphones to Human Head Rotation. *Appl. Sci.* **2022**, *12*, 11506. [CrossRef]
2. Zhou, Y.; Li, Z.; Yu, W.; Yu, Y. Cooperative Control of Interconnected Air Suspension Based on Model Predictive Control. *Appl. Sci.* **2022**, *12*, 9886. [CrossRef]
3. An, F.; Li, H.; Zhang, X.; Sun, C.; Liu, B. Experimental Research on Reducing Flow-Induced Cavity Resonance with a Narrowband Active Noise Control System. *Appl. Sci.* **2022**, *12*, 7044. [CrossRef]
4. Han, D.; Zhang, G.; Zhao, J.; Yao, H.; Liu, H. Study on Band Gap and Sound Insulation Characteristics of an Adjustable Helmholtz Resonator. *Appl. Sci.* **2022**, *12*, 4512. [CrossRef]
5. An, F.; Wu, Q.; Liu, B. Feedback Controller Optimization for Active Noise Control Headphones Considering Frequency Response Mismatch between Microphone and Human Ear. *Appl. Sci.* **2022**, *12*, 977. [CrossRef]
6. Wu, K.; Liu, J.; Li, M.; Liu, J.; Wang, Y. Multi-Mode Active Suspension Control Based on a Genetic K-Means Clustering Linear Quadratic Algorithm. *Appl. Sci.* **2021**, *11*, 10493. [CrossRef]
7. Chu, Y.; Wu, M.; Sun, H.; Yang, J.; Chen, M. Some Practical Acoustic Design and Typical Control Strategies for Multichannel Active Noise Control. *Appl. Sci.* **2022**, *12*, 2244. [CrossRef]

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.