



Signal Processing for Active Control (Signal Processing and its Applications)

By Stephen Elliott

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Signal Processing for Active Control sets out the signal processing and automatic control techniques that are used in the analysis and implementation of active systems for the control of sound and vibration. After reviewing the performance limitations introduced by physical aspects of active control, Stephen Elliott presents the calculation of the optimal performance and the implementation of adaptive real time controllers for a wide variety of active control systems.

Active sound and vibration control are technologically important problems with many applications. 'Active control' means controlling disturbance by superimposing a second disturbance on the original source of disturbance. Put simply, initial noise + other specially-generated noise or vibration = silence [or controlled noise].

This book presents a unified approach to techniques that are used in the analysis and implementation of different control systems. It includes practical examples at the end of each chapter to illustrate the use of various approaches.

This book is intended for researchers, engineers, and students in the field of acoustics, active control, signal processing, and electrical engineering.

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Editorial Review

About the Author

Stephen Elliott is Professor of Adaptive Systems in the Institute of Sound and Vibration Research at the University of Southampton, U.K. He has been involved in research into active control of sound for over ten years and has co-authored two previous AP books: Active Control of Sound (1992--with P.A. Nelson) and Active Control of Vibration (1996--with P.A. Nelson and C.R. Fuller). This book is a volume in the AP Signal Processing and Its Applications Series, edited by Richard Green and Truong Nguyen.

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Preface:

Signal processing applications are now widespread. Relatively cheap consumer products through to the more expensive military and industrial systems extensively exploit this technology. This spread was initiated in the 1960s by the introduction of cheap digital technology to implement signal processing algorithms in real-time for some applications. Since that time semiconductor technology has developed rapidly to support the spread. In parallel, an ever increasing body of mathematical theory is being used to develop signal processing algorithms. The basic mathematical foundations, however, have been known and well understood for some time.

Signal Processing and its Applications addresses the entire breadth and depth of the subject with texts that cover the theory, technology and applications of signal processing in its widest sense. This is reflected in the composition of the Editorial Board, who have interests in:

- (i) Theory-The physics of the application and the mathematics to model the system;
- (ii) Implementation-VLSI/ASIC design, computer architecture, numerical methods, systems design methodology, and CAE;
- (iii) Applications-Speech, sonar, radar, seismic, medical, communications (both audio and video), guidance, navigation, remote sensing, imaging, survey, archiving, nondestructive and non-intrusive testing, and personal entertainment.

Signal Processing and its Applications will typically be of most interest to postgraduate students, academics, and practising engineers who work in the field and develop signal processing applications. Some texts may also be of interest to final year undergraduates.

Richard C. Green
The Engineering Practice,
Farnborough, UK

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